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# QUEENSLAND AGRICULTURAL JOURNAL.

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QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## HINTS TO COTTON-GROWERS.

When Queensland was a cotton-exporting country, the American Civil War was raging, and small supplies of American cotton were only obtainable by English buyers through the medium of blockade-runners, and the demand was so great that the mixed condition of much of the Queensland cotton shipped to England was not too closely scrutinised; hence, a bale of cotton, consisting of several varieties—long and short stapled—mixed together, brought almost, if not quite, as much as a bale of only one variety. It is even on record that a ginowner at Oxley, at the close of the picking season, ginned a large quantity of damaged cotton, which was brought in by farmers when delivering their seed cotton at the gin-house, and used for engine-cleaning. This cotton consisted of immature and weather-beaten stuff, discoloured—red, blue,

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yellow, and brown. Two bales of this cotton were shipped with other bales. When the account sales arrived, this rubbish fetched the same price as the best, 1s. 0½d. per lb. The only remark of the Liverpool agent was that "a couple of bales appeared to be slightly damaged by salt water"!

Such a case could not well recur, even during the present scarcity of cotton, owing to the war and to the serious decline in the American crop, due mainly to the ravages of the boll weevil, which have resulted in abnormally high prices for all classes of cotton. The production of Sea Island cotton seems to be in a precarious condition, judging by the following article published in "Cotton and Cotton Oil News," of 30th October, 1916, reprinted from "Cotton Record," under the caption "A Crisis in Sea Island Culture"*:—

Three or four years ago there was a crisis in the Sea Island industry. The demand almost entirely ceased, and although the production was not at all excessive, prices fell to a discouragingly low level. Nobody seemed to want Sea Island cotton any more, and it looked as if the cultivation would have to be abandoned.

"Another crisis has developed; and, although the cause is entirely different, the ultimate tendency is the same—namely, the abandonment of the industry. On the former occasion, the industry was menaced through lack of support, consumers appearing to prefer the cheaper imported article. This time it is menaced through impossibility of production.

"Already the boll weevil has reached the Sea Island section, and Sea Island cotton is more seriously endangered than Upland is. The Sea Island is of slower development; it has to be planted about a certain season, and is not so susceptible to forcing. With Sea Island, there is no way of sneaking in a fair crop before the weevil gets to actual work. And, besides, the Sea Island territory does not usually have those extremes of temperature which to some extent restrict the development of the weevil. It appears that by the time the weevil has spread to the whole Sea Island section, the chances for a crop will be almost nil. The weevil will not be starved out by the abandonment of Sea Island culture for a season or two; efforts will be made to grow Upland cotton, and the insect will be perpetuated.

"Even this year's crop is quite disappointing; for, while the acreage was possibly the largest ever planted, the production is hardly an average one. The moderate crop and the increased obstacles in the way of obtaining the foreign cotton have combined to bring about an acute situation in the market, and prices are higher than for many years.

* Sea Island cotton derives its name from the Sea Islands—James, Edisto, Wadmalaw, and John's—off the coast of South Carolina, U.S.A., which are under the influence of the warm Gulf Stream, its warmth giving rise to considerable condensation, resulting in a dampness of the atmosphere and heavy dews, which contribute to the perfect maturing of the fibre. Uplands cotton can thrive even with long spells of dry weather, whereas any long absence of moisture is injurlous to the Sea Island plant.

"The demand for cotton of a long and strong staple is constantly increasing. It furnishes the best fibre for making the web of automobile tires, and the call for this purpose is expanding by leaps and bounds. With a tire costing up to $40 or more, and the web an indispensable part of it, what difference would an advance of 5 to 10 cents in the price of Sea Island cotton make to the tire manufacturer? By adding a dollar or two to the price of the tire, he would get back the added cost of the cotton ten or twenty times over.

"Amid the Latin notes to an old Greek text were just two anglicized lines. The Greek author was depicting the scene of a recent savage battle, and the particular incident was a mother, wounded unto death, with her infant at her breast. The two lines in English were these:—

"Suck, little wretch, while yet thy mother lives;
Suck the last drop her fainting bosom gives!"

"For grim pathos it would be difficult to surpass these two ruggedly eloquent lines. Unforgettable, they come back to mind after the lapse of half a lifetime, and seem to suggest an analogy to the present situation in Sea Island cotton.

"Now that the very life of the culture of the staple is menaced, is the trade beginning to realise how very valuable the commodity is? Perhaps, in the course of a comparatively short time, the bosom of mother earth will cease to yield any more. Is it an intuitive apprehension of this peril which makes the formerly indifferent trade so eager to obtain a supply while there is still a little to be had?

"We are not writing an obituary notice or a funeral oration for the Sea Island industry by any means. The industry is threatened by a crisis, but threats are not always fulfilled, and one crisis can be successfully passed through as well as another. Moreover, we have strong faith that the boll weevil problem will eventually be solved."

Queensland farmers who are growing Sea Island or Caravonica this season would doubtless realise very high prices if their crop could be placed on the British or the American market at a reasonable rate. In ordinary times Sea Island cotton was generally quoted at from 1s. 3d. to 1s. 8d. per lb. It is impossible to say what the market price will be in view of the probable total failure and possible cessation of the cultivation of this valuable variety of cotton—probably over 2s. per lb; and Caravonica, being an equally valuable long-stapled cotton, would also participate in a rise in price. Already Upland cotton is bringing 10d. to 1s.; and, were it not for the freight difficulty, growers who send their cotton to the ginned by the Department of Agriculture would find that their cotton crop would be the most valuable of all field crops.

To get on, however, to the main object of this article. What we wish to warn cotton-growers of is that two or three different varieties should not be planted, as we might say colloquially, within "coo-ee" of each other. It should be remembered that bees and other insects are the principal agents in pollinating the flowers, and many of these insects—bees especially—range over a large extent of country. Hence arises the variation in the character of many of our originally choicest fruits.

vegetables, and other plants, including cotton. In proof of this degeneration we may instance a boll of cotton we recently received, supposed to be Russell's Big Boll. It contained twenty-nine seeds, of which thirteen were of Sea Island and sixteen Russell's. Singular to say, these were absolutely distinct, each variety occupying a different section of the boll, and each having its own distinctive characteristics of long and short staple. From a field thus hybridised, only mixed fibre could result, and the price obtained for the ginned cotton would be reduced to the value of shorter staple.

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## COTTON NOTES.

We have frequently expressed the opinion that the revival of cotton-growing in Queensland is not to be brought about by establishing large plantations, but rather by adopting the American plan of small areas grown by farmers in conjunction with other crops. Under the heading "Don't be a Chump," a Texas journal—"Cotton and Cotton Oil News"—gives the following sensible advice:—

"If our farmers had to buy their corn, meat, hay, and other indispensable supplies they would not be benefited much by 15 or 16 cents cotton.

"The lesson this crop teaches is what the Press, the Government demonstrators, the agricultural schools, and colleges, and a hundred other agencies have tried to teach for many years.

"Let not our farmers forget the teachings of past years. Let them not be tempted next spring to plant all cotton, for no farmer can afford to grow 14 or 15 cent. cotton and go in debt to his merchant for farm and family supplies. Don't be a chump.

"This cotton crop is undoubtedly small, yet it will put more money in our farmers' pockets than any other cotton crop ever grown. What is the reason? There are several. In the first place, our farmers produced the crop at less expense than usual. There are fewer debts to be paid out of the proceeds of the cotton crop.

"Again, farmers practised diversification more generally than ever before; and hence they have more corn, more forage and small grain, more vegetables, poultry, hogs, &c., than they have had since the Civil War.

"The prosperity that now blesses the land is not due to the high price of cotton so much as to the diversification which was practised.

"The boll weevil has very nearly made a clean picking of the cotton-fields of Alabama, yet he is not an unmixed evil, since diversification always follows in his wake.

"Even with cotton at 16 cents, farmers should not rely on buying everything they need with cotton money, but they should hold fast to diversification as the path of safety and the highway of prosperity.

The Southern cotton-grower who plants all cotton next year because it is high this year is a short-sighted chump.

"The world demands at least a 15,000,000-bale crop. The production promises to fall short of this demand by 3,000,000 bales or more. Here is a big demand with a small supply, and the result must be high values for the staple."

[The ten to fifteen million 500-lb. bales of cotton produced in the United States are the result of small areas planted by thousands of farmers, who also produce various other crops, raise millions of pigs, and billions of eggs and fowls. The same thing could easily be done in Queensland.]

### MORE COTTON FROM THE COTTON PLANTS.

It is hoped to get a greatly increased cotton crop from the same acreage by means of a method devised by John B. Hall, of Philadelphia, Pa., who has been recently awarded a patent on his system. There is a great deal of loss in the cotton-fields in the shape of cotton-bolls which, for one reason or other, never mature, says "The Scientific American." Mr. Hall contemplates turning the pickers into the fields a little earlier than is usual and picking all the bolls before they are open. They are then treated to a bath of a solution in which starch and talcum enter largely, and in a moderately warm temperature the bolls are artificially opened and the burden of fibre is removed in the usual manner. The cotton recovered in this manner is said to be superior to that allowed to remain longer on the plant, in that it has a beautiful lustre. Another interesting feature of this process is that it is said to bring about the downfall of the boll weevil, which requires to be matured in the boll.

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## CASTOR OIL PLANT.

Of late there has been considerable inquiry as to the cultivation of oil-yielding plants, particularly of the castor oil, as a payable farm crop. There is ample evidence that the plant will thrive almost anywhere on the coast lands of Queensland. In and around Brisbane it may be seen growing and bearing heavy crops of seed in all sorts of out-of-the-way places—on the river banks, in quarries, on unoccupied allotments, &c.: and this applies as well to other coastal localities in Central and North Queensland. No attention has, however, been given to it with a view to turning a plant, which is looked upon almost as a noxious weed, to profitable account. Most people, especially children, know to their sorrow that castor oil is a most valuable medicine; but not many are aware of the large quantities which are used for lubricating machinery and for illuminating purposes. In India it is used on all the railways in the signal and carriage lamps, owing to the brilliancy and safety of the light. It burns very slowly, and thus is more economic than other oils.

The plant is exceedingly hardy and will stand a wide range of climate. The seeds have extraordinary vitality. Oil seeds, as a rule, quickly lose their germinating power; but the castor seed seems to be an exception. Seeds known to have been kept for fifteen years in a bottle have been sown in Queensland, and have produced healthy plants.

In a tropical or even sub-tropical climate the plant becomes a perennial tree instead of an annual, attaining a height of from 20 to 30 ft. The plant should thrive well in the Kilkivan and Nanango districts. The best soil for castor is much the same as that required for the cotton plant —a rich, well-drained, sandy loam. It will not thrive on heavy, wet soils. As the roots penetrate very deeply, the land must be deeply ploughed and well worked. The seed is planted in rows 6 to 8 ft. apart each way, three or four seeds being planted in a hole. Before planting, they should be softened by having hot water poured over them, and then being left to soak for twenty-four hours. In ten days after sowing the seeds will germinate; and when the plants are 8 or 10 in. high, the three weakest must be taken up where four seeds have been put in. They grow very rapidly, and begin to bear in four months. Like the coffee and cotton plants, the castor plant would grow to an inconvenient height if left to itself. It should, therefore, be kept low by pinching back the main stem. This will have the further effect of causing the plant to throw out many more fruit spikes than it otherwise would do. When the tree gets old, the usual scale insect (the *Coccus*) attacks the bark. They have to be dealt with, as in the case of citrus and other fruit trees, by spraying with kerosene emulsion.

When the capsules turn brown, it is time to begin the harvest. This is done by cutting off the spikes and removing them as soon as possible to the barn. The work of harvesting must be done rapidly, for if the seeds are allowed to ripen on the tree the pods burst open and the liberated seeds fly in all directions. This "popping" of the capsules makes the matter of freeing the seeds a very simple one. All that has to be done is to prepare a drying-ground either in a shed or in the open. The ground should either be boarded or swept quite clean. When the spikes are brought in, they should be spread out on the drying-ground to the depth of from 6 in. to 1 ft., according to the heat of the weather. Should rain occur when out-of-door drying is being carried on, draw the spikes into heaps and cover with a tarpaulin. Turn the spikes over frequently to let all get the benefit of the sun. The capsules will soon begin to burst, and in four or five days they will have shed all their seed. All that remains to be done is to sift or winnow out the husks. When drying in the open it is well to surround the drying spikes with a low rampart of galvanised iron or bagging, for the reason that many seeds fly out very violently, and without some such precaution they would be lost.

The return from an acre is about 20 bushels, a bushel of seed weighing 46 lb.

In an article by Mr. W. Soutter on the castor oil plant, published in this Journal in November, 1901, the matter of extracting the oil is discussed. "Those," he wrote, "who would venture to embark in the production of oil-seeds have to face the fact that the market is too far distant to leave a margin of profit after deducting the freight and other charges. The only remedy, therefore, is to endeavour to bring the market nearer, and this can only be done by bringing the oil-miller alongside.

the raw material. The actual outlay in erecting an up-to-date oil mill is not large, as will be seen by the following estimate:—

A mill to deal with 30 to 45 cwt. of castor per day would cost £750.
A mill to deal with 40 to 70 cwt. of castor per day would cost £1,050.
A mill to deal with 100 to 150 cwt. of castor per day would cost £2,400.
A mill to deal with 160 to 200 cwt. of castor per day would cost £3,000.

Skilled labour would be required to make the oil": and Mr. Soutter's idea was to induce "men with the necessary capital to take the matter in hand, and thus find another string for the farmer's bow."*

A comparatively simple process can be tried by anyone interested, and a good oil should result. It is as follows:—

First cleanse the seeds from fragments of the husks and from dust, and submit them to a gentle heat, not greater than can be borne by the hand, which process makes the oil more fluid and more easily expressed. A whitish, oily fluid is thus obtained, which is boiled with a large quantity of water, and all impurities are skimmed off as they rise to the surface. The water dissolves the mucilage and starch, and the albumen is coagulated by the heat, thus forming a layer between the oil and the water. The clear oil is then removed, and boiled with a small quantity of water until aqueous vapour ceases to rise and a small quantity taken out in a phial remains perfectly transparent and cool. The effect of this is to clarify the oil and rid it of volatile acid matter. Care is necessary not to carry the heat too far, as the oil would acquire a brownish colour and an acid taste.

In India the seed is crushed between rollers, placed in hempen cloths, and pressed, and then the oil is heated with water in a tin boiler until the water boils. This separates the mucilage and albumen, the product being finally strained through flannel.

Cheap wooden rollers would serve the purpose, and these could be driven by a horse gear.

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## WEAK POINTS OF SOYA BEANS.

As we have often pointed out, soya beans have their weak points. These are chiefly two. The seed rapidly deteriorates in germination. It is generally unwise to use seed over one season old, and it should not be covered to a depth of over 1½ in. The greatest weakness of the crop is the difficulty in getting good stands. The other serious weakness is that unless it is cut at the right time and handled properly, the beans "pop" out or shatter badly in harvesting. They must not be allowed to get too ripe.

The only safe plan is for each farmer to grow a small acreage until he learns how to handle the crop.—"The Progressive Farmer."

* The cost of such mills to-day would be far higher.—[ED. "Q.A.J."]

# The Horse.

## CAVALRY HORSES.

A correspondent of the "Live Stock Journal," London, writes on this subject as follows:—

"I should like to refer to what various other countries are using as mounts for their cavalry, all of which goes to point to the fact that horses with a percentage of Arabian blood in their veins are used very largely by our Allies, and also recently by the United States expeditionary force sent into Mexico. The small horse of 15 hands has proved himself always the best for campaigns and long-distance rides.

"Many of the horses ridden by the United States cavalry in the recent Mexican rising were Arabs and half-bred Arab-Morgan horses, some being bred by Colonel Spencer Borden at his stud farm at Falls River. It was a long time before the United States Government would consider their use, but Colonel Borden was so sure of what they could do that he persuaded some of the younger cavalry officers to ride some of his Arabs in an endurance test, which they did, beating all comers; the only other one that came anywhere near was a three-quarter bred Arab-Morgan mare, 15 hands. They carried, in most cases, over 12 stone, and had to travel over very bad roads, some of which were covered with snow and ice, as the test took place in winter time.

" The Russians use high-caste Arab stallions for breeding remounts, they having purchased in England among others some years ago the Arab stallion Mesaoud for the figure of 800 guineas from the Crabbett Arabian Stud. The ponies ridden by the Cossacks all have a percentage of Eastern blood in them, and it is well known how easily they endure fatigue and hardship of all kinds. Only a few months ago it was reported that Cossack officers had come through Persia and joined our officers in Mesopotamia after a long ride.

" High-caste Arab stallions are used in the following countries for breeding remounts:—Italy, Portugal, Spain, Java. Sumatra, India, Hungary, Turkey, Egypt, and France. We are about the only cavalry nation that have never tried Arab stallions as sires for our cavalry remounts, although all through the Boer campaign the Arab and the Basuto ponies (half Arab) proved their value on all occasions. One cavalry colonel, who took out five picked Irish hunters and one Arab stallion, had to give the hunters up, as they went to pieces during the first six months, and rode his Arab for the rest of the war, and he never went sick or lame. Hunters, when they came in from a forced march, very often being led by the troopers on account of leg trouble, were unsaddled and turned loose. Instead of having a roll in the sand or dust as the Arab did, they stood about and would not eat, and whinnied for their

grooms to come and rub them down and rug them up and give them their feed of corn, whereas the Arab went off and picked up any herbage he could find, and was content.

"During the Omdurman campaign the cavalry had to leave their horses behind and use Arab and Syrian ponies. Out in the Western States of America no one ever thinks of using a big horse on a cattle round-up or on a long-distance journey. If they did they would soon go to pieces, as they could not thrive on the coarse herbage. The Mexican ponies are full of Eastern blood brought over when the Spaniards conquered Mexico. Some years ago, when there was a race across the desert in Egypt between an English T.B. and an Arab, the former broke down about half way, and the latter finished alone not in the least distressed.

"The reason why Arabs are not popular in this country is: Firstly, on account of their size, which is from 14 hands 1 in. to 15 hands, and people, especially officers, state they are not up to weight, which is not correct, as it is well known they will carry 16 stone all day. Secondly, on account of there being brought to this country at intervals Barbs, Gulf Arabs, Dongola Arabs, and Syrians, and sold here as high caste. They are bought and found to stumble; they will not jump, and have, as a rule, not much of a shoulder; and at once the Arab is condemned, although the people who have had inferior ones probably have never ridden a high-caste one. The writer of this article has one which he has ridden from London to Brighton and back twice.

"I might add, in conclusion, that whatever the high-caste Arab is crossed with—*i.e.*, Cleveland Bay, T.B., Hunter, Trotting, Morgan, or Suffolk—he will stamp his likeness, docility, and hardiness on his young stock; and what would make a finer charger than a high-caste Arab crossed with a T.B. or Cleveland Bay mare?"

## MOST VALUABLE TREE IN THE WORLD.

Everyone who makes a living from the soil might appreciate such a tree as the *Gantor avocado* in Whittier, near Los Angeles, Cal. In no year since it began bearing has it brought its owner (H. A. Woodworth) an income of less than 2,000 dollars (£400), and the annual average is 3,000 dollars (£600). Ordinarily the proceeds from avocado growing range from 400 dollars to 2,000 dollars (£80 to £400) per tree.

The Avocado is more generally known as the Alligator Pear. It is about the size of the Bartlett fruit, and very dark green in colour. The flesh is about the consistency of a banana, and is prized highly for salads. —"Cotton and Cotton Oil News."

[The Avocado or Alligator Pear thrives and bears well in Queensland, but we have never seen them offered for sale, nor do we think they would bring as much in our markets as prime navel oranges. Tastes differ.—Ed. "Q.A.J."]

# The Orchard.

## BANANA CULTURE IN THE TWEED DISTRICT.

By G. E. B. WELSH, Mirambeck Farm, Tweed Heads.

For many years sugar-cane has been the main crop grown in the Tweed district, but since black labour ceased to be available sugar-cane growing has gradually declined, and now, on the rough and hilly country, only small areas are to be seen growing because of the heavy cost of white labour, which has absorbed the profits, the grower finding that, after waiting two years for his crop to mature, very little was left over after paying expenses. Some growers sowed down their land with grass and embarked on the dairying industry; others allowed the lantana to grow up, then brushed the lantana, burnt it, and planted bananas. Some of the plantations in this district look extremely well, and it is fortunate that the banana seems a crop which can be successfully grown in very rough country, because some of the sites selected for banana plantations are so steep and rocky that it is an impossibility to cultivate by means of horse labour. In this district can be seen bananas growing most luxuriantly amongst masses of rock and huge boulders.

Some of the essentials for success in banana-growing are a good rainfall, a well-drained and warm soil rich in potash, and a sheltered position; the rain should fall chiefly in the summer when the soil temperature is high, the chief growing period of the banana, also in the spring to give them a start after the winter. Shelter from rough and cold winds is necessary, because of the immense weight of the bunches causing the stems to sway about when the huge leaves catch the wind, and in consequence the sucker is either broken off or uprooted. The leaves become torn in strips by the wind, but their efficiency is not much impaired by the tearing, because the vascular bundles run parallel to each other and are not broken across; thus their functions are not interfered with.

From reliable reports issued from Queensland's Chief Agricultural Chemist we learn that bananas—plants and bunches—remove from soil the following in lb. per acre:—Pure potash, 271·48; phosphoric acid, 22·52; lime, 102·15; nitrogen, 84·54; these figures convey to our minds the immense importance of potash and lime for bananas. Just as the speed of a locomotive is governed by the amount of fuel and water to supply the steam, so the development and quality of the banana depend on the available supply of plant food. The banana plant is naturally a very rapid grower, and the enormous quantity of potash must be readily available. An inefficient supply is known to adversely affect the formation of carbo-hydrates.

As before mentioned, the bananas in this district are being chiefly grown on old sugar-cane land which has been permitted to become over-

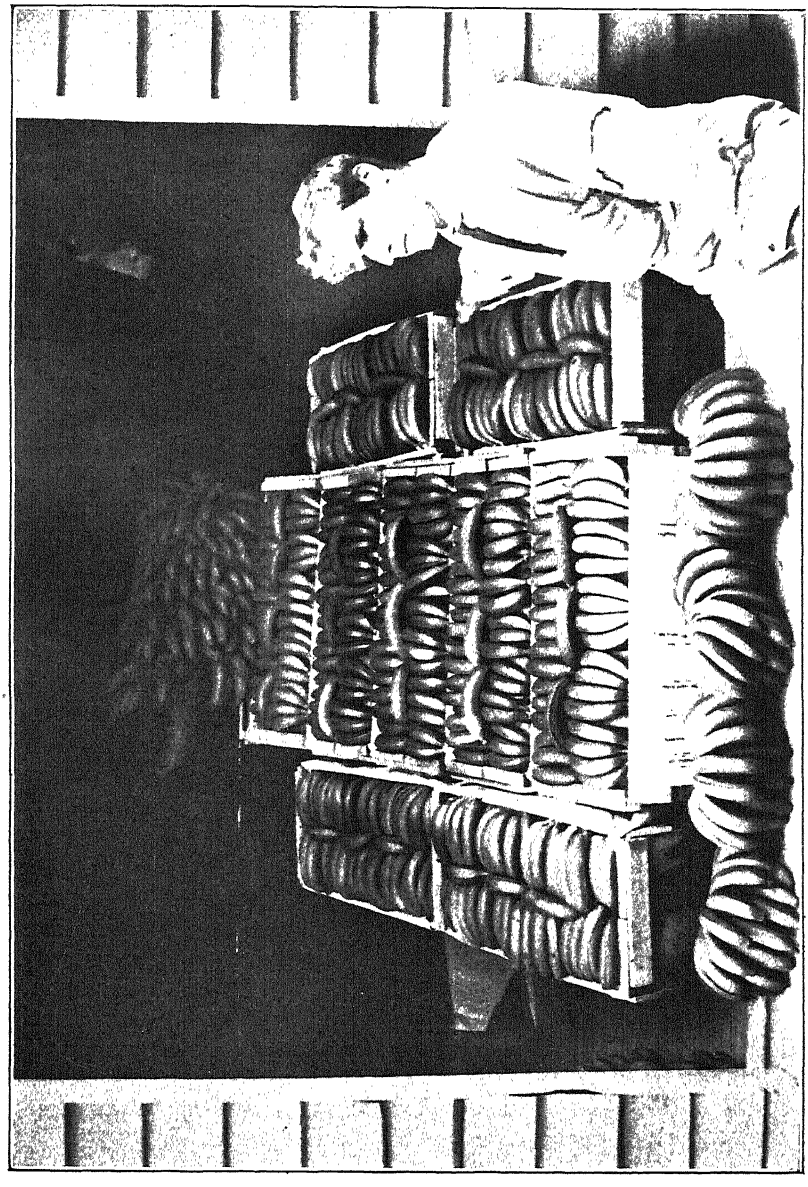


PLATE I.—BANANAS PACKED FOR MARKET.

grown with lantana, and, when burnt, the lantana has furnished a supply of potash in its most available form. This, I believe, explains why, where there has been a heavy growth of lantana followed by a good burn off, the bananas during the first four years thrive so well, the enormous growth of foliage with that dark green, healthy colour, denoting abundance of available plant-food; also, the bunches are large and well-filled. But under this heavy strain of cropping the requisite plant-food becomes exhausted quicker than nature can supply it, the plants assume a yellow-green colour, the bunches are smaller, and eventually the plantation becomes neglected because the crops no longer pay for the labour required. Disease then soon asserts itself, and the grower blames the soil, the weather, the supplier of the stools, or anything but himself.

We must remember bananas are surface rooters, and in comparison to their size their roots do not extend a very long way, whereas the majority of fruit trees establish a system of roots extending in all directions, growing to a great depth as well as covering a large area; they also take several years to establish themselves before the heavy demands of fruit-bearing are made. Trees have been known to send out roots long distances to procure food or water not found close at hand. Bananas are not adapted for this, and if the necessary food is not within easy reach they soon assume an unhealthy and stunted appearance.

We also learn that lime is very necessary for the banana. Having tested samples of soil in this district with dilute hydrochloric acid, I have found it very deficient in lime. Owing to the continued growth of sugar-cane in this district for many years, the soil has become acid in reaction; and it is a well-known fact that microfungi are favoured by an acid reaction, and the action of bacteria which fix nitrogen is hindered. Not only does lime prevent fungoid diseases but it obviates it on soils where they already prevail; dressings of lime also render available both potash and phosphoric acid, which are brought into a more soluble form; and just at this time, when the world's largest store of potash salts is locked up in Germany by the war, it is well to bear in mind that a liberal application of lime to soils deficient in such is a good investment.

It is erroneous to conclude that if superphosphate of lime or bones, which are phosphate of lime, be supplied to the soil, these fertilisers will supply the lime required. Lime or its carbonate is required in the soil to supply a free base. Superphosphate is saturated with sulphuric acid in the process of its manufacture so that there is an excess of acid, and the use of this fertiliser reduces the amount of the carbonate of lime in the soil; in fact, used on land deficient in lime, superphosphate has a favourable influence on the spreading of some fungoid diseases by reason of its increasing the acidity of the soil.

Basic slag is a phosphatic fertiliser which supplies both phosphates and lime to the soil; it is a cheap manure, can be safely stored in bulk, and where land is deficient in lime basic slag will give much better results than superphosphate. Basic slag requires a good rainfall to assist in bringing it into action, and it is a very slow-acting manure, requiring eight to twelve months before its action is seen.

On light porous soils lime exerts a good effect in causing the cohesion of the fine particles; thus the soil becomes more retentive of moisture, enabling crops to better withstand spells of dry weather.

A simple method for testing the acidity of the soil is to procure some blue litmus paper from the chemist and wrap it round a ball of moist soil; should the litmus paper gradually turn red, it denotes an acid soil; if some soil which has received a dressing of lime be wrapped up in the red litmus paper, it will change it back to blue. It is advisable not to handle the litmus paper previous to the test, as such will turn it red and spoil the test. A better and more effective method is to use a flat-bottomed glass, in the bottom of which is placed a round piece of litmus paper, and on top a round piece of white blotting-paper the same size, both resting on bottom of glass; next, place some soil which it is desired to test in the glass, and moisten with clean rain water and stand for an hour or more. Should the colour of the litmus paper be changed to red, it indicates an acid soil; a quick change of colour shows a very acid soil.

As previously mentioned, disease soon asserts itself in a neglected plantation because starvation of an essential food constituent may act as a specific cause of predisposition; the whole matter of immunity from disease is very closely related to the nutrition of the plant and its environment. Queensland fruitgrowers are fortunate in having the advice of a thoroughly qualified staff of experts, but much of their valuable assistance is rendered void to the State simply because some growers are not alive to their own interests. When reports are tendered of diseases and pests, how frequently is the remark made: "It will not pay," or "It is too much trouble." In the case of the merchant with large premises carrying a valuable stock and who neglects to insure such stock, if fire breaks out and consumes his goods, what farmer would not condemn that merchant for taking the risk? Yet, when methods are carefully described and advocated for the prevention and curtailment of diseases and pests, how often the farmer ignores them instead of adopting them, thereby increasing the production of the best crops, free from disease, and thus assisting to meet the demands of home consumption, and in this way preventing the profitable importation of foreign-grown fruit and products and helping to grow an exportable surplus, so that capital may be sent into the country, instead of *vice versâ* to purchase abroad produce inferior to that which can be grown here.

Bananas have many advantages over other crops; they bring in quick returns, their cropping period is more under control and is spread over the whole year, affording a regular income, and they are not so subject to market gluts as fruits which reach maturity only at one season of the year, entailing a great rush of work. Bananas do not suffer to so much extent from insect pests, and are more easily protected from the raids of flying-foxes, as they are cut and marketed when in an unripe state. It is utterly useless to plant bananas within the frost zone or in cold exposed situations, so the grower does not run the risk of losing his whole crop and having to wait another year for returns, as is often the case with peach, plum, and apple growers. Frequently, windfalls

cause a serious depletion in the returns of the latter crop. Pilfering in transit has also to be considered. The large consignments of bananas which reach Sydney every fortnight from Fiji indicate the immense demand and popularity of the banana, and there is no reason why the bulk of this demand cannot be met by the banana districts of Queensland and the Tweed if only growers would plant larger areas, organise, and place the whole trade from the production to the marketing on a thorough business footing. What has been done by the Fiji and Jamaica banana-growers can just as easily be done in Queensland when rational labour conditions are again resumed.

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## THE ALGAROBA BEAN.

*(PROSOPIS JULIFLORA.)*

In the May number of the Journal, 1916, we gave an illustration of this valuable tree, and explained to a correspondent that the seeds he had in his possession were those of the Algaroba or Mezquit Bean, and that another kind is known as the Carob, the Locust, and St. John's Bread. We are still receiving inquiries about the tree; and a perusal of the following paper on "The Carob, by C. W. Beers, County Horticultural Commissioner, Santa Barbara, California" (published in the Monthly Bulletin (Vol. V., No. 8) of the State Commission of Horticulture, Sacramento, Cal.), will be of interest to our correspondents, affording, as it does, the fullest information on the subject:—

### THE CAROB—*CERATONIA SILIQUA.*

For several years the writer has been attempting to interest the farmers of California in the above forage tree, and the demand for some available literature on the matter has led to the preparation of this paper.

#### WHAT IT IS.

The carob is an evergreen tree, growing from 25 to 30 ft. in height, and old trees are reported as 40 in. in diameter. The tree is long-lived, comes readily from seed, and grows with little care after it is once established. In Santa Barbara there are a number of trees, planted eighteen years ago, that are from 15 to 18 ft. high. They are 15 ft. apart in the row, and the branches are interlocking. One tree from the same lot of seedlings has a spread of over 20 ft., and is 30 ft. in height. The carob belongs to the Leguminosæ, and, besides yielding a large amount of highly nutritious forage it enriches the soil by storing up nitrogen through the roots.

#### ADAPTABILITY.

The carob will grow where other plants make a very poor showing. On high, dry, rocky points, by roadsides, along drives, bordering water-courses, anywhere where vacant spots are to be found, there this beautiful glossy foliage tree may be grown, adding to the landscape attractions and every year bearing an abundance of high-grade forage.

It will endure neglect after once established, and can be planted 60 to 100 to the acre where soil conditions are moderately favourable. A recent visitor to Algeria tells me he saw the carob everywhere. In the lower fertile lands were found fruit trees and crops; on the next higher lands grapes were carefully tended; but on the high dry places the carobs were planted, and make a splendid growth.

G. P. Rixford has a record of a carob that grew in a rock crevice at Campo Seco, Calaveras County. He says:—"It had bid defiance for many years to the sulphur fumes from the neighbouring copper smelter which had killed every vestige of vegetation in the vicinity, except the poison oak—*Rhus diversiloba*. It finally succumbed, not to the acid fumes, but from lack of moisture after the little soil in the crevice had been washed out by rains, leaving the roots bare."

Thousands of acres of our own pasture lands, now averaging less than 1 ton of indifferent forage, can be made to produce upwards to 5 tons of carob pods.

## PRODUCTIVITY.

Dr. Aaronshon, of Palestine, who attended the Fresno Convention in 1912, said that seedling trees will produce an average of 350 to 500 lb. per tree. Twenty trees to the acre will thus produce 3½ to 5 tons each year. He reports grafted trees, eighteen years old, bearing 900 to 1,100 lb. each. When one reflects that the carob is easily grafted, the possibilities of a pasture of carobs makes the industry quite worth trying out.

## NUTRITIVE CONTENT.

Pods from six seedling trees now growing in Santa Barbara were sent to the United States Department of Agriculture, Washington, and the following analyses were reported:—

| | A | B | C |
|---|---|---|---|
| Gillespie | 27.14 | 13.78 | 91.94 |
| Gould, No. 38 | 24.82 | 15.02 | 89.98 |
| Gould, No. 27 | 23.39 | 15.65 | 92.28 |
| Gould, No. 24 | 30.20 | 13.16 | 91.84 |
| Gould, No. 18 | 32.58 | 12.57 | 90.24 |
| Gould, No. 9 | 30.34 | 14.31 | 92.00 |

A—Sucrose per cent. B—Reducing sugars per cent. C—Dry substance per cent.

In this report, No. 18 shows a sugar content of 45·15 per cent.; No. 9, 44·65 per cent. sugar; No. 24, 43·36 per cent.; and the Gillespie tree gave 40·92 per cent. The poorest of them is a very rich forage product. Dr. Aaronshon says the pods carry, in addition to the sugar content, a protein supply of 7 to 8 per cent.; and in the Experiment Station Record No. 10, for June, 1905, will be found the analysis of a carob pod that yielded 43·57 per cent. sugar and 15·22 per cent. protein; but allowing only an 8 per cent. of protein and 45 per cent. sugar, and we have the following most interesting and remarkable series of comparisons:—

## COMPARISONS.

Wheat is a rich ration, running higher than the carob, pound for pound; but, to equal 5 tons per acre of carob pods, wheat must yield 3 tons of grain to the acre, which is out of the question.

Alfalfa is a splendid feeding product, and stores up nitrogen in the soil while producing the hay. Compared with the carob at 45 per cent. sugar and 8 per cent. protein, the ground must produce 5 tons per acre, and that on rocky, hilly places, without irrigation and without cultivation. Besides, the carob is one of those trees whose rootlets store up nitrogen in the soil.

We Californians feed quantities of barley, both as a grain ration and as hay, and to make a crop we require good soil, good seasonal conditions; and, when threshed, to equal 5 tons of carob pods, each acre must yield 3½ tons of sweet, dry, first-class barley.

Bean straw is carefully husbanded, baled, and housed, and sold at a price that brings good returns; but, to equal 5 tons of carob pods, each acre must yield 6 tons of bean straw.

It requires 30 tons of carrots to provide the same elements found in 5 tons of carob pods. Corn and cob ground requires 3 tons to the acre to equal the product of 1 acre of carobs. Corn meal must weigh 2½ tons to equal in food product 5 tons of carobs.

Oats are found to be a great ration for milch cows; but, if the crop is to keep pace with carobs, there must be delivered at the sacking shoot 3 tons of grain per acre, or of good clean oat hay the land must yield 4 tons.

Men pay good prices for beet tops to sugar factory people, but, to equal the acreage of the carob, each acre of beets must furnish 38 tons of tops. It is difficult to realise the economic importance of such a product. It requires 3½ tons of cotton-seed meal to equal the acre product of carobs. For human food, it is richer than cow's milk, pound for pound.

## FEEDING.

Horses, cattle, sheep, and hogs take readily to the pods; and turkeys soon learn to fly into the tree, tear off the pods, break them, and eat them. Chickens will readily feed on the pods when broken up. The Arabs feed the pods to their fine horses. The carob is the main forage for the English cavalry horses in Malta and for the tram horses in Naples, while it is a common sight to see the London cabby give his horse a feed of the brown pods while waiting for a customer. The island of Cyprus grows large quantities of this forage, and it constitutes its largest export.

The carob is a splendid avenue tree, and hundreds of California farmers could add very materially to their forage supply by planting these trees where shade and ornamental trees are desired.

## FEEDING VALUE.

Dr. F. W. Woll, Professor of Animal Nutrition, University of California, at the Davis Farm, carried on a feeding test with calves. One bunch of calves received, as their grain portion, ground milo and ground barley, half and half; the other bunch receiving an equal amount of crushed carob pods and ground milo, half and half. This experiment extended over a period of thirteen weeks; and at the close of the period

those fed on milo and barley had averaged a gain of 1·70 lb. per day, while those fed on the carob pods and milo averaged 1·81 lb. Those fed carobs required more hay than the others, so, taking it altogether, the carob showed values equal to ground barley. This test was made with pods from seedling trees, the sugar test being no higher than those mentioned above, and probably much below that average.

### PROPAGATION.

The seeds come readily. By planting the seed pods on edge, close together, in a sprouting-box, with a slight covering of soil, there will be a succession of seedlings, covering two or three years. This method seems to protect the young seedling from the damping-off fungus, that otherwise causes great loss of the young plants. There seems to be a ferment in the pod that protects the early growth. Seeds stripped from the pod and treated with hot water come quickly, but these young plants are very susceptible to the damping-off fungi.

I. L. Knudson, in the Journal of Biological Chemistry, shows that tannic acid is toxic to a large number of fungi. In the early ripening period of the carob, tannic acid is present in large proportions, making the pod very bitter and astringent, and this suggests to my mind that this tannin may remain in the pod to an extent sufficient to inhibit the deadly action of the damping-off fungi on the young seedlings, when the pod itself is planted. In the Journal American Chemical Society, F. M. McClenahan has shown that in the young walnut a very thin seed coat separates the tannic acid, so abundant in the walnut shell, from the fatty substance of the walnut meat; doubtless placed there to protect the fats from the action of the fungi that would destroy them. It has been shown that the tannic acid of the date, persimmon, banana, and olive is not removed by the ripening process, but is sealed up in some manner that renders it insoluble during the process of mastication, so that, although the fruits are delicious to the taste, the tannin remains in the fruits. While the rôle that fats and tannin play with reference to each other may not be known, is there not a suggestion in the findings of Knudson and McClenahan that, possibly, one relation between them is the inhibition of fungus action of fats and sugars during the formative periods? and then, later, the destruction of damping-off fungi at the period of germination?

Possibly this may account for the fact that seedlings grown from planting the entire seed pod are immune from damping-off fungi, while those from cleaned seeds are very apt to be destroyed by them.

### GRAFTING AND BUDDING.

The tree is easily budded or grafted, and the union appears very intimate. Grafted and budded trees bear earlier than seedlings, and produce heavier crops. Only by this method can the nutritive content be determined beforehand, as seedlings do not come true to product; also, the carob is dicœcious,* and in seedling trees there is an excess of

* Dicœcious—a term used when the flowers are unisexual, and the male and female flowers occur on different plants.—[ED. "Q.A.J."]

staminate trees, and by budding or grafting this can be controlled. It has been found that, by budding a single branch of a pistillate tree to a staminate bud, there will result an abundance of pollen to fertilise all the balance of the tree, thus making every tree a fruit-bearer.

### TEMPERATURE RANGE.

Eighteen degrees of frost does not injure the carob to any extent. Frost conditions that did marked damage to citrus trees made no impression on carobs growing within a few feet of them.

### CONCLUSION.

And what more shall be said? Do we advocate planting carobs instead of grains? Shall we plough up our alfalfa and put out this thrifty tree? Are we proposing to revolutionise present good systems of farm procedure? Not at all. But we do urge and expect that the good sense of those who may read this will induce some of them to make a respectable planting of this tree in places where now there is small return, and watch the development.

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## THE AMERICAN PAPAW AND THE TROPICAL PAPAYA.

According to the "Journal of Heredity" for July, 1916, the American papaw is known botanically under the name of *Asimina triloba*, belonging to the family Anonaceæ, which includes the custard apple. It is stated that so little is the papaw known that its very name has been stolen from it and applied, through a confusion in sound, to the tropical papaya (*Carica Papaya*). While this double use of the term is unfortunate, we fear that, as its employment in connection with *Carica Papaya* is world-wide, there is little chance of even the United States ever gaining a monopoly of its use in connection with their northern species of fruit.

The article in question gives an interesting account of the papaw tree, which, in appearance, resembles very much a cacao tree. But the papaw thrives under temperate conditions, and is not in any sense a tropical plant, though many of its near relatives are. One of the promising fields for plant breeding, in connection with the papaw, appears to be in hybridising it with its close relatives, the tropical Anonas—the soursop and the custard apple, for instance. These fruits are larger and finer than the papaw, but too tender to grow in the United States, except in Southern California and Southern Florida. There would appear to be a good chance that they could be crossed with the papaw, and the fruit produced which would be hardy in a large part of the United States, while superior in quality to the papaw itself. So far as is recorded, this cross has never been made.

The above idea of extending the range of a tropical plant by crossing it with its near relatives in a cold country is new and interesting; and there would seem to be no reason why the reverse could not be effected, and some of the more attractive fruit of temperate countries acclimatised by hybridisation to grow in the tropics.—"Agricultural News," Barbados.

# Horticulture.

## THE GERMINATION OF SEEDS.

At a meeting of the Horticultural Society of Charters Towers, Mr. E. Mann read the following interesting paper in October last:—

"In this paper I will try to explain the observation and experiments I have made in my endeavour to grow and acclimatise plants in our tropical climate. I am going to tell you of things that I know, also of those that I don't know, in the hope of picking up a little information when you discuss this paper. In this meeting I have several times stated you must make the soil firm when you plant your seeds to be sure of good germination. I will tell you for why. It is a well-known fact that the more you cultivate the soil amongst growing crops the less water they require; this is because by stirring the top 2 or 3 in. of soil you dry the moisture out of it and create a loose mulch that prevents the moisture in the soil lower down from rising to the surface by capillary attraction and being lost by evaporation, thus leaving more available for the plants; but in planting seeds you have to reverse the process to some extent, as most seeds germinate best when only just covered with soil; and many flower seeds are so small that planted this way they would be no more than $\frac{1}{8}$ in. underground, and in our hot climate the sun will dry the surface of loose soil over 1 in. deep in a day, but by pressing the soil firm you set in motion capillary attraction, which draws the moisture from a lower depth to the surface, as the sun dries it out and so in a great measure protects the seed from being burnt up just as it starts to germinate under the soil. A little light horse manure spread on top of the soil after planting takes the place of cultivation in growing crops, as it protects the soil from the direct rays of the sun, and so retains the moisture at the surface of the soil, where it is most needed; even then our climate is so severe that with small seeds it is better to water twice a day till the plants show through the ground, either morning and midday or midday and evening; never let them go from morning till evening, or you will lose most of them.

"We will now take a few plants in detail. I have no doubt many of you have noticed that while some seeds nearly all germinate at the same time others again come up very irregularly. Phlox is a noticeable example of this, coming up at three or four different times, and it is possible to have plants nearly ready to plant out while others are only just showing through the ground. This is owing to the seed ripening very irregularly on the plant; if you will look at your plants, you will notice the little bunches of seeds are in all stages of ripeness—some have burst and scattered, others are brown and just ready to burst, while others on the same bunch are quite green.

"Well, you know commercially it is impossible to harvest each little pod as it gets ripe, and they are all cut together, so the seed when saved

is not all of the same ripeness, and, so far as my observation goes, the ripe seeds germinate first; the others seem to finish their ripening in some way underground before they germinate; hence the various times of coming up. Another point about phlox. I have often imported from Europe, and never averaged more than 10 per cent. of germination; some years it would fail altogether. After writing several letters and making experiments, I found that, owing to their climate being so much cooler and more moist than ours, the seed did not ripen so hard as with us, and was more affected by the sea voyage. If they had a dry summer, the seed might average 15 to 20 per cent. of germination, but in a wet season hardly a seed would grow. I sent seed of my own growing (in our hot climate) to England for a test, and it averaged 85 per cent. of germination. Imported aster seed is worse than phlox in this respect, as in various years I must have spent about £5 on different kinds and bought enough seed to raise 20,000 plants, but all I have raised so far are three plants. A curious check test that came under my notice was the lupin. I got an imported packet containing six seeds; five germinated in about six days after planting. I saved my own seed from one of them, and the following season planted twelve seeds; they did not come up in a fortnight, so I put more in the same box; as they are large seeds I just pressed them in with my thumb without disturbing the soil in case some of the others might make a late start, but none came up. At the end of another fortnight I planted Dianthus on top of them and covered with new soil without disturbing the old; these came up thick, and when large enough to plant out I started to dig them out of the box. I came across two or three of the lupin seeds just as sound as when I planted them. I chipped one with my knife, and it was all right inside; so I raked out five seeds, chipped them all, and planted them again. Four came up in six days; so you see this was just the reverse of the phlox. Our climate ripened the lupin seed too hard to germinate till I cut through the shell of the seed. To prove this, the following season I did not let the seed ripen on the plant, but picked the pods while they were yellow and dried them indoors, and these seeds germinated six days after planting. In a short paper like this I cannot go into details of many of my experiments. I can only mention a few most prominent examples in each class. I now come to the section that so far has puzzled me, and I hope to obtain some information about, as, if these problems were elucidated, I believe they would enable us to acclimatise many more plants in this country that are now beyond us. The sweet pea is a popular flower, and if planted in April it seems to grow along without any check, and flowers just about right for the show in August, but if you want early flowers and plant in March they very often come up all right but die off again when about 2 in. high, only an odd one here and there pulling through.

"The earlier you plant the more pronounced this dying off becomes. I also notice imported seed is more liable to go than my own, but they all fail when planted too early. I have read of some being killed by mildew, but I could not find any trace of it on mine, and, as they always seem to go off just at the same height, I hardly think it is caused by this disease. I am inclined to think, when planted too early and the weather is too hot, they just grow till the nourishment in the seed is exhausted, and then from some cause not yet known to me they fail to draw nourishment from the soil and so die off; those that do pull through invariably come to a standstill at the 2 in., sometimes for as much as fourteen days; then all at once they rush along, sending out new shoots from the ground level, and come into flower well ahead of those planted later, although these receive no check. Another curious example of germination is the petunia. These I have grown for summer flowers and pulled up in February; from that time onward after the borders were planted with winter flowers the petunias would come up right on to September, and then, when the winter flowers were pulled out and summer flowers planted again, they would come up in thousands week after week. The mystery to me is, Why do these seeds germinate at so many different times when practically under the same treatment, and how can this seed remain sound so long in soil that is constantly watered? Lettuce and celery, if planted in hot weather, will act in a somewhat similar manner. A marked contrast to this is the *Linaria marsuana*. If this seed is planted in March, it will flower from July to November; but I pulled mine out in September. This plant seeds freely, but you rarely see a plant come up during summer; and if you pull out your summer flowers in February or early March, you can plant the borders again and water them without seeing any young plants, but as soon as April arrives they will come up in thousands all over the borders. Now, why do these seeds lie dormant so long, and then all answer the call at about one and the same time? and what protects them from decomposition in the constantly watered soil? The last flower I will mention is perhaps not so well known to you, but as regards germination is the most remarkable plant I know. It is called *Ruellia tuberosa*. The flowers resemble the *Mimulus* in shape, but are a slate blue in colour. I got a packet of seed to try, and raised three plants in March. I planted them out in the border with other flowers, but they made no progress till August; then they started to grow, and, as I thought at the time, sent out flower buds; every day, when watering, I noticed the buds, but they seemed to get no farther forward. At last I dropped the hose and had a close look at them and they were seed pods, formed without any sign of a flower—either petal, pistil, or stamen; and yet when I pulled out the borders at the end of September, there were dozens of young plants all round the old one.

"I was disgusted at getting no flowers, so destroyed two plants, but left one for further trial; and as soon as the borders were clear and the sun could get direct to the soil, this plant started to grow strong and blossomed right through the summer, bearing seed pods exactly like the first that were formed. As the plant is not showy enough for small gardens, I do not recommend it; but I tried it two or three seasons, to notice the results, and every year they acted the same—on the turn of spring the seed pods would come alone, and as the weather got warmer the flowers would come and the seed would germinate freely from either. One curious point was brought to my notice during the last few weeks. When importing phlox and aster seed from Europe with such poor results, I noticed petunia seed in the same collections germinated freely. Now where I am growing my flowers the water is very salt, and in a bed I planted part phlox and part petunias; both germinated, but the phlox died away again, while the petunias grew along and are now coming into flower; so evidently the petunia is a good sailor and likes a little salt. When we consider that most of our seeds are imported from Europe, mostly to seedsmen down South, and then shipped up here under very trying conditions on our coastal boats, it is always a wonder to me we get such a good percentage of germination as we do; and only one word can be used to describe the vitality contained in these small seeds—that is, marvellous."

## FIGHTING IN THE JUNGLE.

### DIFFICULTIES IN THE EAST AFRICAN CAMPAIGN.

In the course of its pursuit of the German forces in East Africa, General Beve's infantry has had some unusually exciting experiences, including encounters with lions and other natives of the jungle. The route lay over indescribably precipitous mountain paths, through dense jungle, and over elephant tracks. General Beve's infantry, abandoning all wheeled transport, without blankets or greatcoats, and subsisting on nothing more than half rations, undertook the pursuit, and was able to join up with General Enslin's mounted brigade on the Moeba River.

The whole force then set out and overtook the enemy, who was again defeated. After the engagement, the correspondent states, the Germans, in the politest possible manner, sent several of our wounded back with a doctor, warning our officers of the danger to wounded men at night from lions, three of which were "put up" in Colonel Nussey's firing line.

A huge python invaded General Beve's quarters, and was despatched with difficulty. Bees also attacked the column, scattering the ammunition mules and horses, and for a time completely checked the infantry advance. The scene of operations was the densest jungle.

Operations have resulted in the complete dislodgment of the enemy from his mountain retreat in East Africa, and the scattering of his remnants. Lindi and Mikindani, the last remaining ports in the German colony, are now occupied by naval forces.—'Exchange."

# Tropical Industries.

## NOTES ON SISAL CULTURE.

1. For the cultivation of the sisal plant, the most suitable lands are poor, rocky, gravelly soils rich in lime (the latter is absolutely necessary), worn-out sugar lands and arrowroot fields, and lands which no longer yield satisfactory wheat crops. Swampy land must especially be avoided. A very suitable soil is one composed mainly of coral rock. On rich soils, the plant will go larger, but the fibre is less in quantity and quality. Another objection is that the plant rapidly comes to maturity, throwing up its flower pole after three or four years, which is the end of the plant's life, and only one crop is harvested. On the poorer lime soils the life of the plant runs to from ten to fifteen years, yielding as many and more crops.

2. The failure of a crop on suitable land and in a warm climate has never been heard of.

3. The land to be planted should be fenced to keep off stock—for the reason that, in feeding round the plants, these are trampled down or kicked out. The plants to form a plantation should not be higher than 10 or 12 in., or even less. Older plants take a much longer time to start growing. When planting all dry leaves at the base of the young plant should be taken off as in the case of pineapples, and the main roots cut off and pared as closely to the trunk as possible. They must be planted perpendicularly, and only the lower portion of the trunk must be covered. The distance apart in the field is a question of soil. In rich soil the rows may be 10 ft. apart, and the plants at intervals of 6 or 7 ft. In poor ground 8 ft. by 6 ft. is as close as the plants should be set. Roadways should be left at intervals of 5 chains.

4. Once a field is planted, it may be practically left to itself, as there is probably no crop, except the castor-oil plant, which requires less care to bring it to perfection than sisal. At the same time, a little care is needed at the outset until the plants are robust. No weeds should be allowed to grow, nor any to overtop the sisal plants, as they require all possible light, air, and sun. Tall weeds may be mown down.

5. In about twelve months suckers will begin to appear, and in twenty-four months these will be produced at the rate of 100 per plant. These must all be removed for two reasons. One is that they deprive the mother plant of the nutriment it requires to produce large leaves and plentiful fibre. The other is that the suckers are valuable either for extending the area under sisal or for sale to intending planters. To plant up 100 acres 60,000 to 100,000 suckers are needed.

6. The life of the sisal plant is intimately connected with the production of the flower-stalk, technically called the "pole." The life of the agave (sisal plant) is a comparatively long one, but the long life may be

While there may be other causes, Jepson puts forth the idea—and rightly, I think—that this is due to their escaping pollination. We all know that, with melon and pumpkin, fruit will not set unless pollen is transferred from the male to the female flower by insects or hand; the usual plan by market gardeners being to nip off and place a male flower shedding pollen against the female flower. When this is done correctly, almost every female sets and a fruit is produced.

Jepson noticed on those cocoanut estates where bees are kept that the bees swarmed around the open inflorescences in great numbers, and, further, that the yield on these plantations was phenomenally high. Palms of five and six years bore heavy crops, and bunches were well filled. He concludes that the general introduction of bees on to cocoanut plantations is well worth a trial in Fiji. It would be interesting to have the observations of the growers in Jamaica on this subject.—"Journal Jamaica Agricultural Society."

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## FOR RUBBER PLANTERS.

### METROLAC.

For the information of rubber planters, the Rubber Growers' Association (London) has published the following concerning an instrument for recording the amount of dry rubber in latex, in pounds and ounces:—

The following are some of the uses to which the "Metrolac" may be put. The value of the instrument, however, will depend to some extent on local conditions:—

#### To Check the Addition of Water to Latex.

1. Results have shown, and it is believed it is now generally admitted, that it is advantageous from all points of view to use little or no water in the collection of latex. The "Metrolac," by giving the amount of dry rubber in the latex, also indicates whether or not water has been added. The amount of dry rubber in latex to which water has not been added will vary with local conditions, methods of tapping, &c., but is usually from 3 to 5 lb. per gallon. The latex of any coolie suspected of having added water can be tested with the "Metrolac" and compared with the latex of other coolies.

2. Where the addition of some water to the latex is allowed, the "Metrolac" will enable a check to be kept on the amount of water added. The addition of small quantities of water has relatively little effect on quality, but where water is allowed some check is necessary to prevent the use of excessive quantities.

#### Bulking.

3. Where latex is bulked (and this procedure is strongly recommended), tests with the "Metrolac" enable the latex afterwards to be watered down to a standard rubber content, so that, for instance, in sheet-making all sheets are of uniform size and thickness, are smoked equally, and are generally uniform.

4. Closely connected with bulking is the correct apportionment of acid for coagulation, sodium bisulphite, &c. The proportions of these reagents necessarily depend on the dry rubber content of the latex. The "Metrolac" enables this to be rapidly ascertained; and so leads to economy and uniformity in the use of coagents, sodium bisulphite, &c.

PAYMENT BY RESULTS.

5. This mostly applies to Ceylon. The amount of rubber brought in by any coolie can be determined by testing with the "Metrolac," and then weighing or measuring the volume of the latex. This has the advantage that, if desired, the latex can be bulked before coagulation, and, secondly, tapping coolies do not need to enter the factory and follow their rubber round in course of washing and creping. It also enables payment by results in the case of rubber for sheet manufacture.

The instrument is graduated in pounds and ounces per gallon: this serves well for testing latex in bulk. For paying coolies by results, it is necessary to measure the latex in units smaller than the gallon: and the unit suggested is the half-pint. The calculation is quite simple, for, as there are 16 oz. to the pound and 16 half-pints to the gallon, the figures on the instrument will correspond to ounces to the half-pint as well as to pounds to the gallon.

It is not always necessary to test each coolie's latex; for, provided that no water has been added, the quality of the latex brought in from the same part of the estate by different coolies will not, as a rule, vary appreciably. Hence it will be sufficient to test the latex of one or two coolies with the "Metrolac."

As a coolie will never know whether his latex will be chosen for testing, he will not run the risk of adding water, or, should be do so, will sooner or later be detected.

6. By means of the "Metrolac" it is also possible to forecast the daily output of dry rubber on the estate.

7. In the case of trees which are tapped too severely or where the resources of the trees are overstrained, the amount of rubber in the latex tends to fall. A check may easily be kept on the quality of the latex by means of the "Metrolac," and, if necessary, a field may be rested or the system of tapping modified at an earlier stage than would otherwise have been.

The "Metrolac is made of brass gilt, and measures about 10 in. long. It is supplied complete with measuring glass for testing, and packed in a box with full instructions for working.

The price of the instrument in Great Britain is 50s., and a discount of 25 per cent. is allowed to members of the Rubber Growers' Association; packing and freight extra.

The sole manufacturers are Messrs. Dring and Fage, 56 Stamford street, London. Orders should be placed with the firm direct.

*Note.*—The trade mark "Metrolac" is registered in Ceylon, Federated Malay States, Johore, Straits Settlements, India, Dutch East Indies, and British North Borneo.

# Science.

## EUCALYPTUS TREES AND MALARIA.

S. L. Bostin writes in the "Scientific American":—

"During the later decades of the nineteenth century it was a common practice to plant blue-gum or eucalyptus trees in the districts infected by malaria fever. It was held that the essential oil produced by the leaves combated the harmful vapours rising from the swamps, laden with the poison of the disease. The discovery that the malarial germ is introduced into the blood by a mosquito has settled once and for all the origin of the disease.

"Yet it is only within the last few months that a somewhat mysterious point has been fully settled. The theory that the eucalyptus trees neutralised the poison vapours is nonsense; yet the fact remains that where blue-gums were freely planted there was always a notable decline in the amount of malaria. For instance, in a certain district near Algiers the placing out of thousands of eucalyptus trees completely transformed the conditions. Malarial fever of a peculiarly virulent type had formerly been a constant feature, but within twelve months of the planting of the blue-gums the disease entirely disappeared, and is now unknown.

"What is the explanation of this circumstance? It has been demonstrated that, of nearly all trees, the eucalyptus absorbs the greatest amount of water. Seeing that blue-gums increase in height with great rapidity, often growing many inches a day in a hot position, the amount of moisture taken up increases on a greatly progressive scale. And this is just what brings about the downfall of the malarial mosquito. To complete its life cycle it is necessary that this insect should pass its larval stage in pools of water. With the coming of the eucalypti these pools and indeed all marshy places disappear; the breeding spots of the mosquitos are gone, and in time the insects vanish altogether. The district is then free from malarial trouble simply because the carriers of the disease are not able to keep going."

# Chemistry.

## "THE FERTILISERS ACT OF 1914" AND "THE FERTILISERS ACT AMENDMENT ACT OF 1916."

By J. C. BRÜNNICH, Agricultural Chemist.

Slowly but surely the value of artificial fertilisers is becoming recognised by our farmers and fruitgrowers. Unfortunately many factors, like high cost of fertilisers, heavy freight charges, uncertainty of seasons, &c., restrict a more extensive use. Instead of applying fertilisers, including lime, and practising an intense cultivation to obtain the best results, heavy yields and crops of superior quality, the majority of both farmers and orchardists are trying to increase the production by the cultivation of larger areas.

We have numerous instances of the **excellent results** obtained by fertilising and liming of soils, and it is interesting to record that, in spite of highly fertile lands available and in use for pineapple culture in Queensland, record crops were grown on comparatively poor sandy soil by judicious application of **lime** and **artificial fertilisers.** On the same farm timely application of certain nitrogenous fertilisers, recommended by us, to crops, which due to adverse climatic conditions were very backward and promising failure, produced immediate recovery and excellent yield.

The demand for **cheap artificial fertilisers** is becoming acute, and, therefore, it is not surprising to find that for the past few years **crude fertilisers** were sold, without a guaranteed analysis, as such fertilisers did not come under the provisions of "*The Fertilisers Act of* 1914," and were of such a variable composition that in many cases such fertilisers were not worth the freight paid for them.

In many places deposits of such crude fertilisers, like **sheep manure, bat guano, ashes,** &c., exist and could be utilised, but, on account of exposure to all weathers, composition must vary, and only a sale based on the actual amounts of fertilising substances contained therein will be of justice to the farmer. Of equal importance to the agriculturist is **lime,** in its various forms, which acts both directly and indirectly as a fertiliser and also improves the physical condition of the soil. Not only the **purity** of the lime, but also the state of **fineness** in which it is applied, must be taken into account.

In order to include abovementioned cases, "*The Fertilisers Act of* 1914" had to be amended, and, in accordance with "*The Fertilisers Act Amendment Act of* 1916," the **definition** of "**Fertiliser**" now reads as follows :—

"Any substance or compound containing in appreciable quantity nitrogen, phosphoric acid, potash, or lime, manufactured, produced, or prepared in any manner for fertilising the soil or supplying nutriment to plants ; also any excrement of animals or any natural substance or

natural product which is used for fertilising the soil or supplying nutriment to plants: Provided that the term does not include farmyard manure, stable manure, seaweed, crude nightsoil."

It will be seen that now only such products as **stable** and **farmyard manure, crude nightsoil,** and **seaweed** may be sold as manures without guarantee of composition; any other crude product, or offal, if specially treated or not, will be classed as a fertiliser if sold for the purpose of fertilising the soil.

No person shall sell fertiliser unless he is **licensed** as a **dealer** under the Act.

Any person who desires to become licensed as a dealer shall apply in writing to the Minister for Agriculture and Stock, in the form of Schedule I. of the Act, and transmit the prescribed fee of one guinea. Such license has to be renewed annually.

As under the present amended Act lime and crude fertilisers are included, any person desiring to sell **lime, limestone screenings, coral sand, sheep manure, bat guano, ashes,** &c., to farmers for fertilising purposes must apply for a license.

On or before the 31st January in each year, every dealer shall deliver to the Under Secretary of the Department of Agriculture and Stock a **certificate,** in the form of Schedule III. of the Act, of the specified ingredients of each brand of fertiliser sold by him. Such statement may be amended at any time during the year.

Such **certificate** of **registration** shall set forth the full name and place of business of the dealer, the name of the fertiliser, and the figure, or trade mark, or sign under which such fertiliser is sold, and a chemical analysis certifying that such fertiliser contains certain amounts of specified ingredients, and, in the case of bonedust or bonemeal, basic slag or Thomas phosphate, air-slaked lime, agricultural lime, and gypsum, the percentage of fine and coarse material.

Upon the **sale** of any fertiliser, the dealer shall, at the time of sale or before delivery of the same, give to the buyer an **invoice certificate** signed by the seller or his agent, stating the full name and place of business of the dealer; the name, trade mark, brand, or sign used to mark packages containing such fertiliser and used to identify such fertiliser; the quantity or net weight of fertiliser comprised in the sale; the composition of the fertiliser, setting forth the proportion per centum in which such fertiliser contains the following ingredients:—Nitrogen, phosphoric acid, potash, and lime, and the respective forms in which they respectively occur; and, in the case of bonedust, basic slag, agricultural lime, &c., the percentage of coarse and fine material.

Furthermore, every dealer who sells fertiliser, which term includes offering or exposing for sale and having in possession for sale, shall securely **affix** to each package a printed **label,** clearly and truly certifying :—The number of net pounds of fertiliser in the package ; the figure, trade mark, or sign under which the fertiliser is sold ; the chemical composition of the fertiliser, in the same manner as stated on invoice certificate ; and the state of fineness for certain fertilisers.

A certain amount of **latitude** in the composition is allowed under the Act, in order to allow for slight variations in manufacture ; and the **deficiency,** between the amount of fertilising ingredient found and the amount guaranteed on the invoice and label, must, in the case of nitrogen and potash, be not more than 5 per cent. or 1/20 of the total amount of nitrogen or potash certified to be present, and in the case of phosphoric acid and lime not more than 7 per cent. of the total amount.

On all schedules and labels the amounts of fertilising ingredients have to be stated in a uniform manner, as the old expressions—like bone phosphate, tricalcic phosphate, ammonia, ammonium sulphate, potassium sulphate, &c.—are liable to mislead the farmer. The Act provides for the statement of the valuable fertilising ingredients in percentage amounts of **Nitrogen** (N), **Potash** ($K_2O$), **Phosphoric Acid** ($P_2O_5$), **Lime** (CaO).

Lime may be used in several forms, and the amended Act provides for four classes—

(a) **Caustic lime**, or burnt lime, or quick lime, containing the lime in form of calcium oxide (CaO) ;

(b) **Mild lime** or air-slaked lime, containing the lime chiefly in form of hydrate of lime ($Ca(OH)_2$), obtained by slaking of burnt lime with water ;

(c) **Agricultural lime,** containing lime in the form of carbonate of lime ($CaCO_3$), and obtained by crushing or pulverising of lime stone, marble, coral, and shells ;

(d) **Gypsum**, containing lime in the form of sulphate of lime ($CaSO_4$).

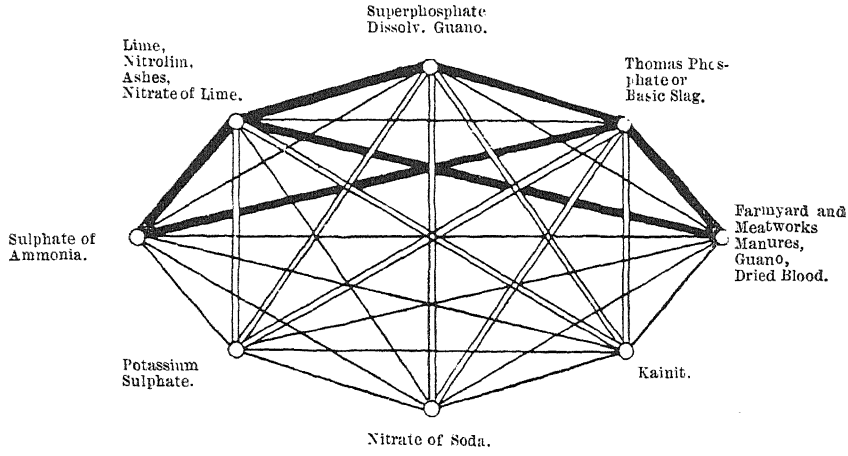
The action of lime in form of powdered quick lime or air-slaked lime is very rapid and powerful, and application is only recommended to very stiff clayey and very acid soils. The safest form is generally agricultural lime, but on account of its insolubility the limestone, in order to become gradually available, must be ground very finely, so that the largest percentage goes through a sieve with forty meshes to the linear inch or 1,600 meshes to the square inch.

The **conversion** of the amount of **fertilising compound** into another is very simple, and, as many old manuring formulae still give the old

denominations, I will herewith give a table which can be used for such calculation :—

| Amount of— | | Multiplied by— | Gives the Corresponding Amount of— |
|---|---|---|---|
| Ammonia | $NH_3$ | 0·824 | Nitrogen, N |
| Ammonium sulphate | $(NH_4)_2SO_4$ | 0·212 | Nitrogen, N |
| Sodium nitrate (Chili saltpetre) | $NaNO_3$ | 0·165 | Nitrogen, N |
| Potassium nitrate (saltpetre) | $KNO_3$ | 0·139 | Nitrogen, N |
| Nitrogen | N | 1·214 | Ammonia, $NH_3$ |
| Nitrogen | N | 4·714 | Ammonia sulphate |
| Potassium sulphate | $K_2SO_4$ | 0·541 | Potash, $K_2O$ |
| Potassium chloride | KCl | 0·631 | Potash, $K_2O$ |
| Potassium nitrate | $KNO_3$ | 0·466 | Potash, $K_2O$ |
| Potash | $K_2O$ | 1·850 | Potassium sulphate |
| Tricalcic phosphate | $Ca_3P_2O_8$ | 0·458 | Citrate insoluble Phosphoric acid $P_2O_5$ |
| Monocalcic phosphate | $CaH_4P_2O_8$ | 0·607 | Water soluble Phosphoric acid $P_2O_5$ |
| Tetracalcic phosphate | $Ca_4P_2O_9$ | 0·391 | Citrate soluble Phosphoric acid $P_2O_5$ |
| Limestone, marble | $CaCO_3$ | 0·560 | Lime, CaO |
| Gypsum | $CaSO_4$ | 0·411 | Lime, CaO |

When **mixing fertilisers,** such mixtures must be avoided which would lead to decomposition, which, for instance, would take place if ammonium sulphate was mixed with lime (quick lime and air-slaked lime) or with Thomas phosphate, or if lime was mixed with superphosphate ; or, again, mixtures which would lead to caking. A very simple guide for the mixing of manures is given in the accompanying diagram, devised by Dr. Geekens, which I slightly modified, however, to apply to our local conditions :—




Manures joined by a *heavy black line* should *never be mixed* together ; those connected by a *double line* must only be *mixed immediately before use* ; and those joined by a *thin single line* may be safely *mixed* together *at any time*.

It must be clearly understood that the lime mentioned in the diagram refers to quick lime and air-slaked lime only. **Agricultural lime** may be **safely mixed** with any of the artificial fertilisers.

It is quite impossible to fix at the present day a **monetary manurial value** per ton, as potash manures are practically unprocurable. It is,

however, of interest to note that fertilisers in Victoria may be purchased at a very much lower rate than in Queensland; and from the Victorian official list published in January, 1916, I note the following quotations :—

Bonemeal and bonedust, from £6 to £7 per ton.
Superphosphate (18 % $P_2O_5$), from £4 7s. 6d. to £4 10s. per ton.
Concentrated superphosphate (44 % $P_2O_5$), £12 10s. per ton.
Nitrate of soda, £14 10s. per ton.
Sulphate of ammonia, £18 per ton.
Sulphate of potash, £25 per ton.

Our own local prices are very much higher, and this is largely due to the limited demand and want of competition. If only farmers and fruitgrowers would combine and order their fertilisers direct from the manufacturers, they would effect a considerable saving.

On account of the great **shortage** of **Potassic manures,** it is of importance to save any material rich in potash, and attention must be drawn to the analysis of **ashes of plants** and **woods** given at the end of this article. Such ashes could, in most cases, be directly utilised as fertiliser, although the low percentage would not allow the manufacture of a pure potash salt therefrom. The amount of ashes actually obtained on burning of timber is generally very small.

Several samples of such ashes have been received from time to time, and the Department will be always pleased to have such ashes analysed in order to get at the manurial value. In order to make such information of general value, the name of the plant or tree or specimen for botanical identification should be sent with the sample of ash.

Under the Fertilisers Act samples of the various fertilisers on the market were obtained and analysed. The results are given in the following table, and in the few cases where **deficiencies** in the fertilising ingredients were found the **values** are **printed in heavy type.**

The Acts are framed for the **protection** of the farmer, to ensure him to receive a fair value for his money, and this is only possible when he knows that the fertiliser he buys contains the guaranteed amounts of fertilising ingredients.

Any farmer in doubt about the quality of fertiliser purchased should at once apply to the nearest inspector under the Act, in order to let him draw a sample and submit same for analysis. All inspectors appointed under "*The Diseases in Stock Acts*, 1896 to 1898," "*The Diseases in Plants Act of* 1896," "*The Dairy Produce Acts*, 1904-1911," and the expert and inspector under the Pure Seeds Acts of 1913 and 1914, are officers under the Fertilisers Act.

# ANALYSES OF FERTILISERS.

| Lab. No. | Fertiliser. | Where Obtained. | Moisture. | PHOSPHORIC ACID, $P_2O_5$. | | | | | | Potash. $K_2O$. | | Nitrogen, N. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Water Soluble. | | Citrate Soluble. | | Total. | | | | | | |
| | | | | Found. | Guaranteed. | Found. | Guaranteed. | Found. | Guaranteed. | Found. | Guaranteed. | Found. | Guaranteed. | |
| | | | % | % | % | % | % | % | % | % | % | % | % | |
| **Simple Fertilisers. Potash Manures.** | | | | | | | | | | | | | | |
| 451 | Sulphate of Potash .. .. .. | Webster and Co., Ltd., Brisbane .. | ·40 | .. | .. | .. | .. | .. | .. | 53·52 | 50·0 | .. | .. | |
| 434 | Ditto .. .. .. .. | Australian Co-op. Fertilisers, Ltd., Brisbane | ·36 | .. | .. | .. | .. | .. | .. | 53·64 | 52·0 | .. | .. | |
| 536 | Ditto .. .. .. .. | J. Croker, Mackay .. .. .. | ·21 | .. | .. | .. | .. | .. | .. | 53·86 | 52·0 | .. | .. | |
| **Simple Fertilisers. Nitrogenous Manures.** | | | | | | | | | | | | | | |
| 452 | Sulphate of Ammonia .. .. | Webster and Co., Ltd., Brisbane .. | 1·57 | .. | .. | .. | .. | .. | .. | .. | .. | 20·55 | 20·0 | |
| 540 | Ditto .. .. .. .. | J. Croker, Mackay .. .. .. | 1·78 | .. | .. | .. | .. | .. | .. | .. | .. | 20·52 | 20·0 | |
| 658 | Ditto .. .. .. .. | Fearnley and Co., Ltd., Cairns .. | 1·45 | .. | .. | .. | .. | .. | .. | .. | .. | 20·55 | .. | |
| 433 | Nitrolim .. .. .. .. | Aus. Co-op. Fertilisers, Ltd. Brisbane | .. | .. | .. | .. | .. | .. | .. | .. | .. | 18·00 | 18·0 | |
| 440 | Nitrate of Soda .. .. .. | ditto .. .. .. .. | 3·45 | .. | .. | .. | .. | .. | .. | .. | .. | 15·24 | 15·8 | |
| 453 | Ditto .. .. .. .. | Webster and Co., Ltd., Brisbane .. | 1·08 | .. | .. | .. | .. | .. | .. | .. | .. | 16·00 | 15·0 | |
| 538 | Ditto .. .. .. .. | J. Croker, Mackay .. .. .. | 1·15 | .. | .. | .. | .. | .. | .. | .. | .. | 15·97 | 15·5 | |

| Lab. No. | Fertiliser. | Where Obtained. | Moisture. | PHOSPHORIC ACID, $P_2O_5$. | | | | | | Potash. $K_2O$. | | Nitrogen, N. | | Coarse. % | Fine. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Water Soluble. | | Citrate Soluble. | | Total. | | | | | | | |
| | | | | Found. | Guaranteed. | Found. | Guaranteed. | Found. | Guaranteed. | Found. | Guaranteed. | Found. | Guaranteed. | | |
| | | | % | % | % | % | % | % | % | % | % | % | % | | |
| **Bone, Blood, Meatworks, Manures, &c.** | | | | | | | | | | | | | | | |
| 464 | Bonedust, " Normanby " .. .. | E. A. Jordan, Aspley .. .. | 6·96 | .. | .. | .. | .. | 24·92 | 24·20 | .. | .. | **3·22** | 3·80 | | 22·4 |
| 456 | Ditto " Runcorn" .. .. | T. H. Wood, Brisbane .. .. | 6·27 | .. | .. | .. | .. | 24·06 | 24·20 | .. | .. | **3·60** | 4·00 | | 43·9 |
| 501 | Ditto | S. Francis, Ipswich .. .. .. | 8·09 | .. | .. | .. | .. | **22·74** | 25·80 | .. | .. | 2·91 | 2·72 | 49·6 | 50·4 |
| 443 | Ditto " Runcorn" .. .. | Dalgety and Co., Ltd., Brisbane .. | 8·09 | .. | .. | .. | .. | 23·30 | 21·85 | .. | .. | **3·32** | 4·00 | 65·3 | 34·7 |
| 6 | Ditto .. .. .. .. | H. Baxter and Co., Maryborough .. | 8·51 | .. | .. | .. | .. | 23·97 | 20·50 | .. | .. | **3·34** | 4·63 | 74·8 | 25·2 |
| 478 | Bonemeal, " Wattle" .. .. | W. E. Hammond, Toowoomba .. | 6·56 | .. | .. | .. | .. | 27·12 | 19·00 | .. | .. | 2·73 | 2·80 | 47·4 | 52·6 |
| 644 | Dried Blood, Q.M.E. .. .. | J. Tytherleigh, Woombye .. | 9·41 | .. | .. | .. | .. | .. | .. | .. | .. | 12·08 | 12·00 | .. | .. |
| 435 | Ditto .. .. .. .. | Aus. Co-op. Fertilisers, Ltd., Brisbane | 8·49 | .. | .. | .. | .. | .. | .. | .. | .. | 12·15 | 12·52 | .. | .. |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 462 | Dried Blood, Q.M.E... .. .. | W. Hacker, Chermside .. .. | 10·34 | .. | .. | .. | .. | .. | .. | .. | .. | 12·45 | 12·50 |
| 454 | Ditto .. .. .. .. | Webster and Co., Ltd., Brisbane .. | 9·00 | .. | .. | .. | .. | .. | .. | .. | .. | 11·77 | 12·0 |
| 436 | Dried Blood, Birt and Co. .. .. | Aus. Co-op. Fertilisers, Ltd., Brisbane | 10·12 | .. | .. | .. | .. | .. | .. | .. | .. | 12·61 | 12·83 |
| 628 | Fertiliser, Baynes Bros. .. .. | E. Gleeson, Stanthorpe .. .. | 8·45 | .. | .. | .. | .. | 19·31 | 19·75 | .. | .. | 4·32 | 4·27 |
| 477 | Ditto .. .. .. .. | G. Searle and Sons, Toowoomba .. | 13·94 | .. | .. | .. | .. | **16·24** | 19·75 | .. | .. | 5·64 | 4·27 |
| 449 | Fertiliser, Redbank .. .. .. | C. Taylor and Co., Brisbane .. | 9·47 | .. | .. | .. | .. | 13·78 | 8·19 | .. | .. | 7·28 | 7·35 |
| 461 | Ditto .. .. .. .. | W. Hacker, Chermside .. .. | 7·16 | .. | .. | .. | .. | 14·59 | 8·19 | .. | .. | 6·66 | 7·35 |
| 463 | Ditto .. .. .. .. | G. Early, Chermside .. .. | 8·34 | .. | .. | .. | .. | 13·11 | 8·19 | .. | .. | 7·66 | 7·35 |
| 466 | Ditto .. .. .. .. | Farmer .. .. .. .. | 8·18 | .. | .. | .. | .. | 13·10 | .. | .. | .. | 7·63 | .. |
| 437 | Fertiliser, Redbank (mixed) .. | Aus. Co-op. Fertilisers, Ltd., Brisbane | 14·55 | .. | .. | .. | .. | 14·59 | 8·15 | .. | .. | 6·23 | 7·53 |
| 448 | Fertiliser, Q.M.E. .. .. .. | C. Taylor and Co., Brisbane .. | 5·23 | .. | .. | .. | .. | **13·46** | 16·76 | .. | .. | 7·41 | 6·13 |
| 465 | Fertiliser, Oxley .. .. .. | Farmer .. .. .. .. | 1·86 | .. | .. | .. | .. | 13·81 | .. | .. | .. | 6·12 | .. |
| 535 | Fertiliser, Fitzroy .. .. .. | Warry's, Ltd., Maryborough .. | 6·48 | .. | .. | .. | .. | 16·45 | 16·94 | .. | .. | 5·52 | 5·15 |
| 643 | Fertiliser, Hutton's Special .. .. | J. Tytherleigh, Woombye .. | 7·10 | .. | .. | .. | .. | 15·50 | 14·10 | .. | .. | 5·06 | 6·17 |
| 659 | Fertiliser, Burdekin .. .. .. | Headricks, Ltd., Cairns .. .. | 4·57 | .. | .. | .. | .. | 19·75 | .. | .. | .. | 4·11 | .. |

## Superphosphates, Basic Superphosphates.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 439 | Superphosphate, Paton, Burns, Ltd. | Aus. Co-op. Fertilisers, Ltd., Brisbane | 5·22 | 17·07 | 16·5 | .. | .. | 18·32 | .. | .. | .. | .. | .. |
| 450 | Superphosphate, Crown .. .. | Webster and Co., Ltd., Brisbane .. | 4·03 | 18·94 | 16·0 | .. | .. | 19·87 | .. | .. | .. | .. | .. |
| 447 | Superphosphate, Shirley's No. 1 .. | Paul and Gray, Ltd., Brisbane .. | 3·37 | 16·90 | 17·0 | .. | .. | 18·76 | .. | .. | .. | .. | .. |
| 460 | Ditto .. .. .. .. | W. Hacker, Chermside .. .. | 2·26 | 16·92 | 17·0 | .. | .. | 17·90 | .. | .. | .. | .. | .. |
| 537 | Ditto .. .. .. .. | J. Croker, Mackay .. .. .. | 1·04 | 16·64 | 16·5 | .. | .. | 17·80 | .. | .. | .. | .. | .. |
| 627 | Ditto .. .. .. .. | E. Gleeson, Stanthorpe .. .. | 9·23 | 16·55 | 16·5 | .. | .. | 20·45 | .. | .. | .. | .. | .. |
| 4 | Ditto .. .. .. .. | Corser and Co., Maryborough .. | 4·68 | 17·43 | .. | .. | .. | 18·04 | .. | .. | .. | .. | .. |
| 476 | Ditto .. .. .. .. | Walsh and Co., Toowoomba .. | 7·13 | 20·07 | .. | .. | .. | 21·87 | .. | .. | .. | .. | .. |
| 442 | Superphosphate, Hasell's .. .. | Dalgety and Co. Brisbane .. | 5·05 | 21·08 | 16·5 | .. | .. | 21·58 | 17·50 | .. | .. | .. | .. |
| 441 | Basic Superphosphate, Paton, Burns Ltd. | Aus. Co-op. Fertilisers Ltd., Brisbane | 9·44 | 10·48 | .. | 19·70 | 18·0 | 19·70 | 19·00 | .. | .. | .. | .. |

## Mixed Fertilisers.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Shirley's— | | | | | | | | | | | | | |
| 458 | No. 8 .. .. .. .. | W. Hacker, Chermside .. .. | 2·29 | **10·10** | 13·0 | .. | .. | 11·08 | .. | .. | .. | 3·74 | 4·0 |
| 629 | No. 8 .. .. .. .. | R. B. Lawson, Stanthorpe .. | 4·31 | **11·95** | 13·0 | .. | .. | 12·32 | .. | .. | .. | 3·90 | 4·0 |
| 5 | No. 8 .. .. .. .. | Corser and Co., Maryborough .. | 3·90 | **11·31** | 13·0 | .. | .. | 11·52 | .. | .. | .. | **3·62** | 4·0 |
| 444 | No. 8 .. .. .. .. | Paul and Gray, Ltd., Brisbane .. | 2·57 | **11·34** | 13·0 | .. | .. | 12·16 | .. | .. | .. | 3·91 | 4·0 |
| 445 | No. 10 .. .. .. .. | ditto .. .. .. | 5·93 | 13·62 | 13·0 | .. | .. | 14·69 | .. | .. | .. | 1·95 | 2·0 |
| 455 | No. 10 .. .. .. .. | T. H. Wood, Brisbane .. .. | 5·91 | 13·91 | 13·0 | .. | .. | 14·80 | .. | .. | .. | 2·10 | 2·0 |
| 457 | No. 10 .. .. .. .. | W. Hacker, Chermside .. .. | 4·98 | 12·78 | 13·0 | .. | .. | 12·90 | .. | .. | .. | 2·28 | 2·0 |
| 446 | No. 20 .. .. .. .. | Paul and Gray, Brisbane .. .. | 5·47 | **8·47** | 10·0 | 10·59 | .. | 12·18 | .. | **2·13** | 4·0 | 3·90 | 4·0 |
| 655 | No. 20 .. .. .. .. | J. Tytherleigh, Woombye .. | 6·18 | **7·36** | 10·0 | .. | .. | 9·97 | .. | **2·18** | 4·0 | **3·58** | 4·0 |
| 459 | No. 20 .. .. .. .. | W. Hacker, Chermside .. .. | 5·02 | **7·53** | 10·0 | 9·90 | .. | 10·36 | .. | **2·14** | 4·0 | 3·88 | 4·0 |
| 539 | Easterby's Mixture .. .. .. | J. Croker, Mackay .. .. .. | 1·32 | 6·95 | 7·0 | .. | .. | 7·06 | .. | 8·65 | 7·0 | 8·87 | 7·0 |

NOTE.—All figures in heavy type are below the deficiency allowed under the Act.

**Wood and Plant Ashes.**

| — | — | Phosphoric Acid, $P_2O_5$. | Potash, $K_2O$. | Lime, CaO. | Per Cent. of Crude Ash in Wood or Plant. |
|---|---|---|---|---|---|
| | | % In | % Crude | % Ash. | |
| Apple Tree | | ·34 | 4·45 | 29·85 | .. |
| Banana Plant | | 1·48 | 36·64 | 21·32 | .. |
| Belar | | ·02 | 4·95 | 49·10 | .. |
| Blackbutt | | ·04 | 2·02 | 7·27 | .. |
| Bloodwood | | ·27 | 5·25 | 8·47 | .. |
| Bottle Tree | | ·24 | 29·02 | 23·48 | .. |
| Boxwood | | ·87 | 1·85 | (?) | .. |
| Brigalow | | .. | ·89 | 54·40 | .. |
| Cedar | | ·71 | ·71 | 48·50 | 1·00 |
| Cotton Pods | | 2·18 | 29·93 | 8·28 | 5·3 |
| Crow's Foot Elm | Atherton | 6·24 | 5·75 | 46·91 | .. |
| Gidyea | | ·90 | 1·10 | 48·70 | .. |
| Hardwood (Sawmill) | | ·60 | 1·90 | 29·33 | ·31 |
| Ironbark | | ·82 | 1·53 | (?) | .. |
| Lantana | | 3·57 | 13·96 | 16·95 | .. |
| Lantana (twigs and leaves) | | 3·50 | 11·78 | 11·52 | .. |
| Mangrove (leaves and twigs) | Russell Island | 1·98 | 8·14 | 15·95 | .. |
| Ditto ditto | Sandgate | 2·12 | 4·42 | 12·30 | .. |
| Mangrove, black | Cairns | ·56 | 1·34 | 35·88 | .. |
| Mangrove, blue | Sandgate | 2·52 | 2·14 | 16·72 | .. |
| Mangrove (*Ceriops Candolleana*) | Cairns | ·76 | 3·28 | 36·80 | .. |
| Nettle Wood | Crow's Nest | 4·14 | 6·46 | 28·05 | 3·36 |
| Oregon Pine | | ·50 | 1·31 | 29·12 | ·77 |
| Pine | | ·89 | 9·97 | 38 05 | ·82 |
| Pineapple Plant | | 5·88 | 15·02 | 7·20 | .. |
| Prickly-pear | Dulacca | ·48 | 9·48 | 19·92 | 1·2 to 2·6 |
| Red Gum | | ·38 | 4·17 | (?) | .. |
| Sawmill Ashes (chiefly Pine) | | 1·11 | 8·72 | 34·14 | .. |
| Sisal Hemp | | 4·60 | 8·00 | 31·86 | .. |
| Spotted Gum | | ·10 | ·70 | (?) | .. |
| Stinking Roger | | 15·81 | 20·00 | 27·18 | 2·62 |
| Sugar-cane Tops | | 4·90 | 6·49 | 4·78 | .. |
| Sugar-cane Trash | | 3·20 | 4·90 | 4·60 | .. |
| Tobacco | | 5·36 | 27·05 | 46·70 | .. |

## ANALYSES OF WOOL SCOUR LIQUID AND OVERFLOW LIQUID.

Samples of woolscour liquid and overflow liquid received by the Department of Agriculture and Stock from the Charleville Woolscour were sent to the Agricultural Chemist, Mr. J. C. Brünnich, for analysis, with a view to ascertaining the commercial potentialities of the content of lanoline and potash. Following is the result as far as the examination of the fluid has gone. The matter is now in the hands of the Government Bacteriologist for further investigation:—

The samples received from Messrs. Armstrong and Carter had the following composition:—

| | Woolscour Liquid. | Overflow Liquid. |
|---|---|---|
| | Calculated in Pounds per 100 Gallons. | |
| Total Solids | 70·7 | 15·9 |
| (Of which Condi Lanoline) | 11·1 | trace |
| Ash | 21·6 | 6·7 |
| Potash ($K_2O$) | 11·5 | 2·8 |
| Nitrogen (N) | 1·8 | ·7 |
| Lime (CaO.) | ·4 | — |

The woolscour liquid has the well-known composition of woolwash residues, and contains a fair amount of lanoline and potash.

There can be no doubt that such residue has a good commercial value, and should not be allowed to go to waste, but is quite an economic question if such saving can be effected in practice.

19th December, 1916.

(Sgd.) J. C. BRÜNNICH.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH NOVEMBER TO 26TH DECEMBER, 1916.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Bluebelle ... | Jersey ... ... | 22 June, 1916 | 715 | 5·0 | 42·18 | |
| Twylish's Maid | ,, ... ... | 2 Nov. ,, | 666 | 5·1 | 39·91 | |
| Nina ... | Shorthorn... ... | 23 June ,, | 859 | 3·8 | 38·26 | |
| Sweet Meadows | Jersey ... ... | 18 Aug. ,, | 582 | 5·5 | 37·85 | |
| Jeannie ... | Ayrshire ... ... | 27 Oct. ,, | 796 | 3·9 | 36·42 | |
| Lady Dorset | ,, ... ... | 14 Sept. ,, | 808 | 3·8 | 35·99 | |
| Thornton's Fairetta | Jersey ... ... | 26 May ,, | 586 | 5·1 | 35·29 | |
| Comedienne | ,, ... ... | 24 Nov. ,, | 596 | 5·0 | 35·17 | |
| Miss Bell ... | ,, ... ... | 1 Aug. ,, | 534 | 5·4 | 34·08 | |
| La Hurette Hope | ,, ... ... | 6 Oct. ,, | 563 | 5·0 | 33·22 | |
| Lady Annette | Ayrshire ... ... | 11 Nov. ,, | 838 | 3·3 | 32·29 | |
| Queen Kate | ,, ... ... | 15 June ,, | 765 | 3·5 | 31·32 | |
| Lady Melba | Holstein ... ... | 17 Dec., 1915 | 656 | 4·0 | 30 80 | |
| Rosine ... | Ayrshire ... ... | 6 July, 1916 | 668 | 3·8 | 29·75 | |
| Lilia ... | ,, ... ... | 4 Sept. ,, | 770 | 3·3 | 29·67 | |
| Princess Kate | ,, ... ... | 20 June ,, | 631 | 3·8 | 28·11 | |
| Skylark ... | ,, ... ... | 21 March ,, | 579 | 4·1 | 27·89 | |
| Cocoatina ... | Jersey ... ... | 17 March ,, | 451 | 5·2 | 27·69 | |
| Hedges Dutchmaid | Holstein .. ... | 22 Aug. ,, | 667 | 3·5 | 27·30 | |
| Auntie's Lass | Ayrshire ... ... | 4 April ,, | 624 | 3·7 | 27·05 | |
| Iron Plate ... | Jersey ... ... | 9 Dec. ,, | 407 | 5·5 | 26·47 | |
| Charity ... | ,, ... ... | 28 May ,, | 421 | 5·1 | 25·35 | |
| Lady Loch II. | Ayrshire ... ... | 17 March ,, | 532 | 3·8 | 23·70 | |
| Mistress Bee | Jersey ... .. | 21 Jan. ,, | 336 | 5·9 | 23·46 | |
| Netherton Belle | Ayrshire ... ... | 11 March ,, | 469 | 4·2 | 23·14 | |
| Belinda ... | ,, ... ... | 27 Feb. ,, | 411 | 4·2 | 20·28 | |

The above cows were fed on natural pasture only.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, NOVEMBER 28 TO DECEMBER 27, 1916.

Nine thousand seven hundred and eight eggs were laid during the month, an average of 133 per pen. Broodies have again been numerous, while individual birds have started to moult, Mr. Pocock and Meneely divide the monthly prize with 157 eggs each. The following are the individual rceords :—

| Competitors. | Breed. | Dec. | Total. |
|---|---|---|---|
| *J. Zahl | White Leghorns | 148 | 1,183 |
| *T. Fanning | Do. | 131 | 1,162 |
| *Miss M. Hinze | Do. | 146 | 1,158 |
| *J. M. Manson | Do. | 148 | 1,142 |
| *A. T. Coomber | Do. | 146 | 1,142 |
| G. H. Turner | Do. | 142 | 1,124 |
| W. Meneely | Do. | 157 | 1,117 |
| J. R. Wilson | Do. | 153 | 1,111 |
| A. Howe, N.S.W. | Do. | 134 | 1,109 |
| Geo. Tomlinson | Do. | 152 | 1,093 |
| Dr. E. C. Jennings | Do. | 140 | 1,080 |
| *E. A. Smith | Do. | 146 | 1,060 |
| J. M. Manson | Black Orpingtons | 142 | 1,059 |
| *A. E. Walters | White Leghorns | 141 | 1,056 |
| *E. F. Dennis | Do. | 141 | 1,055 |
| *Mrs. J. Jobling, N.S.W. | Black Orpingtons | 85 | 1,040 |
| Mrs. Munro | White Leghorns | 142 | 1,038 |
| *Dixie Egg Plant | Do. | 129 | 1,037 |
| Mrs. W. D. Bradburne, N.S.W. | Do. | 140 | 1,034 |
| Geo. Prince | Do. | 136 | 1,023 |
| A. W. Bailey | Do. | 144 | 1,022 |
| T. Taylor | Do. | 133 | 1,019 |
| Kelvin Poultry Farm | Do. | 145 | 1,014 |
| W. Lyell | Do. | 126 | 1,012 |
| T. B. Hawkins | Do. | 119 | 1,009 |
| *J. H. Gill, Victoria | Do. | 151 | 1,007 |
| *J. F. Dalrymple, N.S.W. | Rhode Island Reds | 127 | 1,004 |
| H. W. Broad | White Leghorns | 135 | 1,004 |
| T. E. Jarman, N.S.W. | Do. | 136 | 1,002 |
| *W. H. Knowles, junr. | Do. | 144 | 998 |
| W. Purvis, S.A. | Do. | 150 | 986 |
| P. Brodie | Do. | 142 | 985 |
| E. Pocock | Do. | 157 | 985 |
| F. Clayton, N.S.W. | Do. | 145 | 979 |
| A. H. Padman, S.A. | Do. | 154 | 978 |
| *C. Knoblauch | Do. | 133 | 978 |
| *E. West | Do. | 128 | 974 |
| R. Burns | S. L. Wyandottes | 129 | 974 |
| Mars Poultry Farm | White Leghorns | 139 | 969 |
| H. Jobling, N.S.W. | Black Orpingtons | 125 | 966 |
| Cowan Bros., N.S.W. | White Leghorns | 152 | 963 |
| A. F. Camkin, N.S.W. | Do. | 130 | 963 |
| Mrs. C. Davis | Do. | 133 | 962 |
| J. Anderson, Victoria | Do. | 144 | 956 |

## EGG-LAYING COMPETITION—*continued.*

| Competitors. | Breed. | Dec. | Total. |
|---|---|---|---|
| E. F. Dennis ... ... ... ... | Black Orpingtons ... | 136 | 954 |
| *Kelvin Poultry Farm ... ... ... | White Leghorns ... | 121 | 953 |
| Cowan Bros., N.S.W. ... ... ... | Black Orpingtons ... | 108 | 951 |
| T. Fanning ... ... ... ... | Do. ... ... | 147 | 950 |
| King and Watson, N.S.W. ... ... | White Leghorns ... | 130 | 946 |
| *W. L. Forrest, N.S.W.... ... ... | Do. ... ... | 115 | 938 |
| W. Becker... ... ... ... ... | Do. ... ... | 136 | 926 |
| W. Hirst, N.S.W. ... ... ... | Do. ... ... | 136 | 921 |
| C. P. Buchanan ... ... ... ... | Do. ... ... | 117 | 918 |
| S. B. Tutin ... ... ... ... | Do. ... ... | 94 | 917 |
| J. G. Ritchie ... ... ... ... | Do. ... ... | 138 | 910 |
| G. W. Holland ... ... ... ... | Do. ... ... | 151 | 908 |
| Mars Poultry Farm ... ... ... | Black Orpingtons ... | 140 | 898 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 127 | 893 |
| *J. H. Madrers, N.S.W. ... ... | Do. ... ... | 114 | 883 |
| *J. W. Macrae ... ... ... ... | Black Orpingtons ... | 122 | 877 |
| P. Burns ... ... ... ... ... | Do. ... ... | 113 | 877 |
| J. Goslay ... ... ... ... ... | White Leghorns ... | 108 | 854 |
| *J. Anderson, Victoria ... ... ... | Red Sussex ... ... | 101 | 844 |
| Moritz Bros., S.A. ... ... ... | White Leghorns ... | 150 | 837 |
| Harveston Poultry Farm ... ... | Do. ... ... | 135 | 831 |
| H. Hammill, N.S.W. ... ... ... | Do. ... ... | 144 | 824 |
| F. W. Leney ... ... ... ... | Do. ... ... | 124 | 819 |
| W. Lindus, N.S.W. ... ... ... | Do. ... ... | 144 | 812 |
| W. H. Forsyth, N.S.W. ... ... | Black Orpingtons ... | 91 | 795 |
| L. K. Pettit, N.S.W. ... ... ... | White Leghorns ... | 119 | 793 |
| A. T. Coomber ... ... ... ... | Sicilian Buttercups ... | 120 | 754 |
| F. W Leney ... ... ... ... | Rhode Island Reds ... | 113 | 719 |
| E. F. Dennis ... ... ... ... | White Wyandottes ... | 94 | 655 |
| Totals ... ... ... ... | ... | 9,708 | 70,689 |

* Indicates that the pen is engaged in single hen test.

## RESULTS OF SINGLE HEN TEST.

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| J. Zahl ... ... ... ... | 186 | 202 | 213 | 191 | 197 | 194 | 1,183 |
| T. Fanning ... ... ... | 206 | 204 | 202 | 197 | 181 | 172 | 1,162 |
| Miss Hinze ... ... ... | 200 | 179 | 221 | 176 | 198 | 184 | 1,158 |
| J. M. Manson ... ... ... | 180 | 217 | 177 | 180 | 206 | 182 | 1,142 |
| A. T. Coomber ... ... ... | 198 | 204 | 200 | 167 | 173 | 200 | 1,142 |
| E. A. Smith ... ... ... | 205 | 188 | 171 | 197 | 149 | 150 | 1,060 |
| A. E. Walters ... ... ... | 184 | 206 | 170 | 156 | 191 | 149 | 1,056 |
| E. F. Dennis ... ... ... | 165 | 199 | 150 | 199 | 184 | 158 | 1,055 |
| Mrs. Jobling ... ... ... | 179 | 217 | 152 | 167 | 152 | 173 | 1,040 |
| Dixie Egg Plant ... ... ... | 223 | 205 | 213 | 200 | ... | 196 | 1,037 |
| J. H. Gill ... ... ... ... | 142 | 172 | 162 | 198 | 171 | 162 | 1,007 |
| J. F. Dalrymple ... ... ... | 155 | 162 | 187 | 137 | 192 | 171 | 1,004 |
| W. H. Knowles, junr. ... ... | 160 | 161 | 170 | 145 | 187 | 175 | 998 |
| C. Knoblauch ... ... ... | 151 | 175 | 156 | 150 | 173 | 173 | 978 |
| E. West ... ... ... ... | 199 | 182 | 149 | 149 | 134 | 161 | 974 |
| Kelvin Poultry Farm ... ... | 150 | 158 | 159 | 138 | 200 | 148 | 953 |
| W. L. Forrest ... ... ... | 181 | 183 | 52 | 173 | 184 | 155 | 938 |
| J. H. Madrers ... ... ... | 115 | 172 | 177 | 162 | 132 | 125 | 883 |
| J. W. Macrae ... ... ... | 117 | 188 | 164 | 152 | 124 | 132 | 877 |
| J. Anderson ... ... ... | 160 | 132 | 174 | 81 | 173 | 124 | 844 |

# General Notes.

## NATURE IN FARMING.

By JOHN W. PATERSON, B.Sc., Ph.D., Professor of Agriculture in the University of Western Australia.

We have received from Mr. Thomas C. Lothian (the Lothian Book Publishing Company, Melbourne) a copy of the above work, which, in our opinion, ranks high amongst agricultural text-books, not only for students proposing to enter on a farming career but also for those who have been engaged in agriculture all their lives. The past generation of farmers in this fertile land of Australia raised their crops with scanty appliances and little or no experience in farming, and the rich soil bountifully responded to the most barbarous methods of cultivation. But they left their successors, as an inheritance, the duty of restoring the land to its original fertility. How this is to be done is amply described in the book under notice, and, what is most important, the student is given therein the reason why; and this is really the principle on which the very valuable instruction given in every page of the work is based. Many agricultural text-books are so scientifically constructed that much of the instruction they are intended to impart is lost in a fog of scientific language, rendering them of little value to the student. Such cannot be said of this book. As the author says: "In Australia a book is wanted on agricultural science which shall take cognisance of local conditions and deal in a fair sense of proportion with the various problems which confront us." This is precisely the book which fulfils the conditions, and we confidently recommend it to all agricultural students, not alone for the explanation of how things are to be done but for the underlying principle why they are done.

The price of the book is 4s. 6d.

## THE FARMERS HANDBOOK.

Five years ago the agricultural literature of the Commonwealth was enriched by the compilation and publication, by the Department of Agriculture of New South Wales, of the first edition of the Farmers' Handbook, which met with such appreciation of its value to the man on the land and to agricultural colleges and other educational establishments as a text-book that the edition was soon exhausted, and it was proposed to issue a reprint of it. Recognising, however, the advances made in practical and scientific agriculture, and the changes and improvements in agricultural practice, the Department of Agriculture of New South Wales very naturally and wisely came to the conclusion that a second edition of the book, even with modernised additions, would not entirely

meet the farmers' needs at the present day. To bring the book up to date, therefore, the principal articles—dealing with crop production, practical agriculture, and stock breeding and feeding—have been rewritten by officers of the department, whilst good use has been made of various articles which have appeared in the "Agricultural Gazette" of New South Wales.

The book is divided into sections, the first dealing with the climate, soils, timber, grasses, &c., of New South Wales. Section 2 is devoted to manures of various kinds, whilst the subjects of clearing and fencing, water conservation, farm buildings, and shade trees are well treated in section 3. Sections 4 and 5 go fully into the cultivation of cereals; and root, leguminous, vegetable, and miscellaneous crops, together with native and introduced grasses, are discussed in the next six sections. Section 12 (fourteen pages) gives full information concerning silos, silage, and silage crops. The remaining sections treat of seed and seed testing, weeds, carpentry, blacksmithing, harness repairs, and farm bookkeeping. A copious index enables any subject to be at once found in these pages. The value of the book to the farmer cannot be overstated, and the Department is to be congratulated on the ability of the writers and compilers thereof.

## PISÉ BUILDINGS FOR FARMERS.

Having taken up a selection either for farming or grazing, the settler in the old days of the "colony" of Queensland, forty or fifty years ago, either rigged up a tent for his first home, or, if in a locality where there was plenty of splitting timber or tea-tree, he rose to the dignity of a humpy of low log walls roofed with tea-tree bark, or stripped some sheets of stringy bark and built a bark hut; later on, perhaps, he split slabs and shingles, and dwelt in a fairly comfortable house. In the primeval scrub or forest, this question of housing himself, and perhaps his family, was easily solved. But it was otherwise when the farm happened to be situated on the plains. Then it meant either continuous tent life, or, as the alternative, a galvanised iron or a sawn timber structure, both very expensive in the pre-railway days. Yet, all the time on the treeless plain, all the materials were at hand for the construction of a comfortable weather-proof house, warm in winter, cool in summer, which could be erected by the farmer himself, the only tools needed being a pick, shovel, and rammer, and half a dozen planks.

The material for the construction of the walls, chimney, and flooring was the soil itself. All that the settler need do is to dig out the soil and shovel it into rough wooden moulds, ramming it down solid in layers of 4 or 6 in. When the mould or box is full and well rammed, it is taken to pieces and erected on another portion of the building, and the work proceeds until the walls and partitions are completed. Any inexperienced man can thus construct a comfortable dwelling, as the actual pisé work presents so little difficulty that it can be done by anyone who has sufficient strength to shovel earth and wield a rammer, and is careful

to see that the moulds or boxes into which the soil is shovelled are kept plumb and in straight lines. The services of a carpenter, unless the settler has some knowledge of that trade, will be found necessary to make doors and window-frames and construct the roof, and see that these are set correctly and in their proper places.

The whole process is well described in the "Agricultural Gazette of New South Wales" by Mr. G. L. Sutton, Cowra Experimental Farm, 2nd May, 1907.

In some of the South American States there are numbers of such buildings constructed either of rammed soil or of adobé or sun-dried bricks (for which material like clay can be used), which is unsitable for pisé work. For the latter, almost any soil containing a fair amount of loam is suitable; but a pipeclay loam, with which gravel is intermixed, is best. Soil which cakes after a heavy rain, or which, if ploughed or dug when dry, turns up in hard clods, is very suitable. Any vegetation growing on the surface of the earth selected must be removed, as also should any roots, bits of stick, or vegetable matter likely to decay. The earth is best used as it is dug, and, if too dry, should be brought to the correct moist condition by watering it about two days before it is to be used. The earth should be just moist enough to be crumbly, and yet adhesive enough to retain the impression of the fingers when pressed in the hand.

We have culled the above preliminary notes on pisé building from Mr. Sutton's exhaustive description in the abovenamed "Gazette." It is stated that pisé buildings are much cooler than buildings constructed with solid brick walls. Some idea may be formed of the durability of pisé by the fact that there is at present, at North Logan, a stable built of pisé which has been in constant use for over sixty years, and which is to-day in good order, notwithstanding the fact that the external walls are unprotected from the weather. Pisé buildings are said to have a life of 150 years.

It is, however, advisable to protect the walls from moisture, especially from rain, which should be guarded against by surrounding the building with verandas or by overhanging eaves. Pisé buildings not so protected are, however, very common.

## SOCIETIES.

The title of the Mooloolah and Glenview Farmers' Progress Association has been altered to " The Mooloolah and Glenview Branch of the Queensland Farmers' Union," Mr. C. Ballard, secretary, *vice* Mr. W. Ellison.

Gayndah.—Gayndah P.I.A. and H. Society. Show dates: 5th and 6th June, 1917.

Warwick.—Eastern Downs H. and A. Association's Jubilee Patriotic Show, 13th 14th, and 15th February.

The annual show of the Pine River Agricultural, Horticultural, and Industrial Association will be held on 8th and 9th June, at Lawnton.

Nerada (*viâ* Innisfail).—Nerada Farmers and Settlers' Progress Association. A. Andrickson, secretary.

Mr. J. A. Hunter has been appointed secretary of the Dalby Pastoral and Agricultural Association, *vice* Mr. W. R. Hunter.

## GINSENG.

By an oversight the illustrations of the Ginseng plant and root were omitted from our November issue, in which the cultivation of this valuable root was described. We ask our readers to accept the belated photograph.

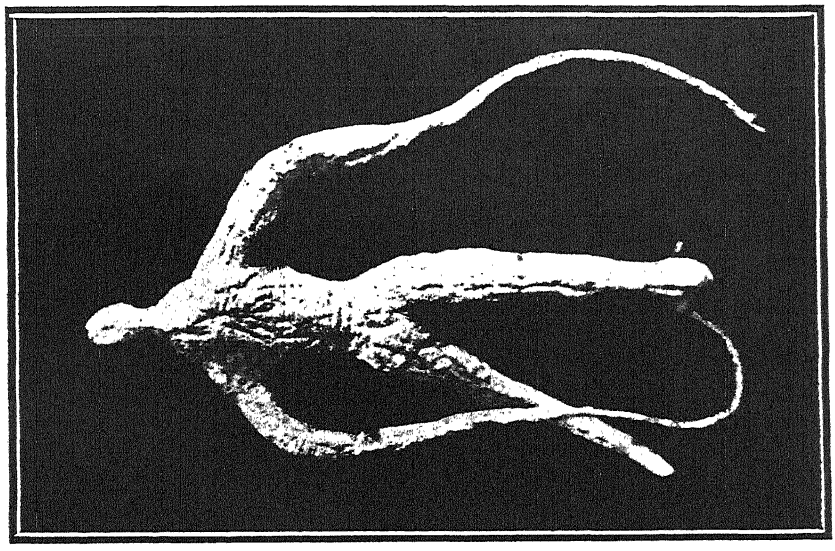


PLATE 3.—HUMAN FORM SPECIMEN OF THE GINSENG ROOT.

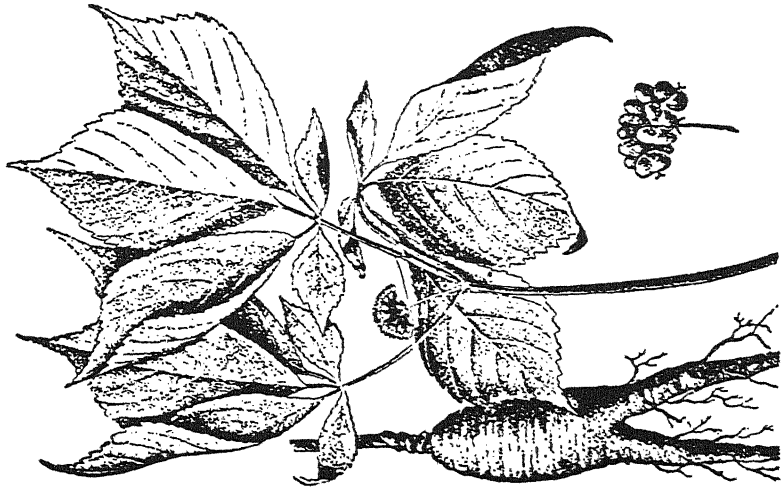


PLATE 2.—AMERICAN GINSENG.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR DECEMBER, 1916.

| Article. | | DECEMBER. |
|---|---|---|
| | | Prices. |
| Bacon | lb. | 9d. to 1s. |
| Barley | bush. | 4s. 3d. |
| Bran | ton | £5 5s. |
| Broom Millet | ,, | £22 to £24 |
| Butter | cwt. | 149s. 4d. |
| Chaff, Mixed | ton | £1 5s. |
| Chaff, Oaten | ,, | £5 15s. |
| Chaff, Lucerne | ,, | £4 3s. to £4 5s. |
| Chaff, Wheaten | ,, | £3 5s. |
| Cheese | lb. | 8d. to 8½d. |
| Flour | ton | £12 10s. |
| Hams | lb. | 1s. 3d. to 1s. 4d. |
| Hay, Oaten | ton | ... |
| Hay, Lucerne | ,, | £2 10s. to £3 |
| Honey | lb. | 5d. to 5½d. |
| Maize | bush. | 3s. to 3s. 3d. |
| Oats | ,, | 2s. 6d. to 3s. |
| Onions | ton | £6 10s. to £7 10s. |
| Peanuts | lb. | 3d. to 4d. |
| Pollard | ton | £5 5s. |
| Potatoes | ,, | £6 to £6 6s. |
| Potatoes (Sweet) | cwt. | 3s. 6d. |
| Pumpkins (Cattle) | ton | £1 10s. to £1 15s. |
| Eggs | doz. | 8d. to 10d. |
| Fowls | pair | 5s. to 8s. 9d. |
| Ducks, English | ,, | 4s. to 6s. |
| Ducks, Muscovy | ,, | 6s. to 8s. 6d. |
| Geese | ,, | 8s. 6d. to 9s. 6d. |
| Turkeys (Hens) | ,, | 12s. to 14s. |
| Turkeys (Gobblers) | ,, | 25s. to 28s. 6d. |
| Wheat | bush. | 4s. 10d. to 5s. 2d. |

## VEGETABLES—TURBOT STREET MARKETS.

| | |
|---|---|
| Asparagus, per bundle | 8d. |
| Cabbages, per dozen | 9d. to 1s. 6d. |
| Beans, per sugar bag | 6d. to 1s. 6d. |
| Beetroot, per dozen bunches | 9d. to 1s. |
| Carrots, per dozen bunches | 4d. to 9d. |
| Cauliflowers, per dozen | ... |
| Chocos, per quarter-case | 1s. 6d. to 2s. |
| Celery, per bundle | 1s. 3d. to 1s. 9d. |
| Cucumbers, per dozen | 3d. to 6d. |
| Custard Marrows, per dozen | 6d. to 1s. |
| Vegetable Marrows, per dozen | 6d. to 1s. |
| Lettuce, per dozen | 4d. to 9d. |
| Parsnips, per dozen bunches | 6d. to 9d. |
| Peas, per sugar bag | 1s. to 3s. |
| Sweet Potatoes, per sugar bag | 1s. 3d. to 2s. |
| Table Pumpkins, per dozen | 1s. 6d. to 2s. |
| Tomatoes, per quarter-case | 6d. to 4s. |
| Turnips, per dozen bunches | 1s. to 1s. 6d. |
| Rhubarb, per dozen bundles | 6d. to 1s. |

## SOUTHERN FRUIT MARKETS.

| Article. | DECEMBER. Prices. |
|---|---|
| Bananas (Queensland), per case | 13s. to 16s. |
| Bananas (Fiji), per case | 18s. |
| Bananas (G.M.), per case | 19s. to 21s. |
| Custard Apples, per tray | ... |
| Lemons (Local), per bushel-case | 6s. to 10s. |
| Mandarins, per case | 7s. to 10s. |
| Mangoes, per bushel-case | 6s. to 10s. |
| Oranges (Navel), per case | 12s. to 18s. |
| Oranges (other), per case | 7s. to 10s. |
| Passion Fruit, per half-case | ... |
| Pears, per case | 5s. to 15s. |
| Papaw Apples, per double-case | 5s. to 10s. |
| Persimmons, per half-case | ... |
| Pineapples (Queens), per double-case | 6s. 6d. to 7s. 6d. |
| Pineapples (Ripleys), per double-case | 6s. to 7s. 6d. |
| Pineapples (Common), per double-case | 6s. to 7s. 6d. |
| Tomatoes (Queensland), per half-bushel-case | 10s. |
| Strawberries (Local), per dozen punnets* | 10s. to 21s. |

* 1 punnet = 1 quart.

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | DECEMBER. Prices. |
|---|---|
| Apples, Eating, per case | 10s. to 14s. |
| Apples, Cooking, per case | 7s. 6d. to 8s. 6d. |
| Bananas (Cavendish), per dozen | 3d. to 5½d. |
| Bananas (Sugar), per case | 6s. to 8s. |
| Cape Gooseberries, per case | 4s. 6d. to 9s. |
| Citrons, per cwt. | 12s. |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per quarter-case | 3s. 6d. to 4s. 9d. |
| Custard Apples, per quarter-case | 5s. to 6s. |
| Granadillas, per quarter-case | ... |
| Lemons (Lisbon), per quarter-case | 8s. to 12s. |
| Limes, per quarter-case | ... |
| Mandarins, per quarter-case | 10s. to 13s. |
| Mangoes, per case | ... |
| Oranges, (Navel), per case | 9s. to 16s. |
| Oranges (other), per case | 6s. 6d. to 7s. 6d. |
| Oranges (Seville), per cwt. | 10s. |
| Papaw Apples, per case | 2s. 6d. |
| Passion Fruit, per quarter-case | 6s. to 10s. |
| Peaches, per quarter-case | ... |
| Pears, per half-bushel-case | ... |
| Peanuts, per pound | 3d. to 4d. |
| Persimmons, per quarter-case | ... |
| Plums, per case | ... |
| Pineapples (Ripleys), per dozen | 1s. to 3s. |
| Pineapples (Rough), per dozen | 1s. to 2s. 6d. |
| Pineapples (Smooth), per dozen | 1s. 6d. to 2s. 9d. |
| Quinces, per case | ... |
| Rockmelons, per dozen | ... |
| Rosellas, per sugar-bag | ... |
| Strawberries, per dozen boxes | 2s. 6d. to 5s. |
| Tomatoes, per quarter-case | 1s. 6d. to 4s. 6d. |

## TOP PRICES, ENOGGERA YARDS, OCTOBER, 1916.

| Animal. | OCTOBER. Prices. |
|---|---|
| Bullocks | £17 7s. 6d. to £21 12s. 6d. |
| Bullocks (Single) | ... |
| Cows | £10 15s. to £14 10s. |
| Merino Wethers | 33s. 3d. |
| Crossbred Wethers | 35s. |
| Merino Ewes | 25s. 6d. |
| Crossbred Ewes | 29s. 3d. |
| Lambs | 35s. 3d. |
| Pigs | 73s. |
| Pigs (Slips) | ... |

## TOP PRICES, ENOGGERA YARDS, NOVEMBER, 1916.

| Animal. | NOVEMBER. Prices. |
|---|---|
| Bullocks | £17 15s. to £21 12s. 6d. |
| Cows | £11 17s. 6d. to £14 7s. 6d. |
| Merino Wethers | 33s. 9d. |
| Crossbred Wethers | 33s. 9d. |
| Merino Ewes | 29s. 9d. |
| Crossbred Ewes | 33s. |
| Lambs | 32s. 9d. |
| Pigs | 69s. |

## LONDON QUOTATIONS.

LONDON, November 4.—The market for frozen rabbits is steady, and prices are unchanged.

Jute: November-December shipment from Calcutta, £35 10s. per ton.

Hemp: October-December shipment, £51.

Rubber: Fine hard Para, 3s. 5d. per lb.; plantation, first latex crepe, 2s. 6⅝d.; smoked sheet, 2s. 6¼d.

Copra: South Sea, October-December shipment, £35 15s. per ton.

Raw linseed oil: Spot pipes, £46 per ton.

The Liverpool quotations for middling American cotton, November-December shipment, is 12·07½d. per lb.

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF NOVEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING NOVEMBER, 1916 AND 1915, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | Nov. | No. of Years' Records. | Nov., 1916. | Nov., 1915. |
| *North Coast.* | In. | | In. | In. |
| Atherton ... ... | 1·90 | 15 | 5·21 | 1·68 |
| Cairns ... ... | 4·22 | 34 | 2·13 | 1·51 |
| Cardwell ... ... | 4·20 | 44 | 4·46 | 3·20 |
| Cooktown ... ... | 2·97 | 40 | 1·06 | 0·61 |
| Herberton ... ... | 2·45 | 29 | 2·39 | 0·50 |
| Ingham ... ... | 3·84 | 24 | 5·25 | 0·51 |
| Innisfail ... ... | 6·55 | 35 | 2·23 | 0·37 |
| Mossman ... ... | 2·39 | 4 | 2·36 | 1·66 |
| Townsville ... ... | 1·63 | 45 | 3·75 | 0·33 |
| *Central Coast.* | | | | |
| Ayr ... ... ... | 1·35 | 29 | 5·14 | 0·12 |
| Bowen ... ... | 1·25 | 45 | 1·57 | 0·86 |
| Charters Towers ... | 1·51 | 34 | 2·89 | 0·04 |
| Mackay ... ... | 2·90 | 45 | 3·93 | 7·16 |
| Proserpine ... ... | 3·13 | 13 | 2·42 | 1·14 |
| St. Lawrence ... | 2·27 | 45 | 1·93 | 4·64 |
| *South Coast.* | | | | |
| Biggenden ... ... | 2·32 | 17 | 4·93 | 2·42 |
| Bundaberg ... ... | 2·51 | 33 | 6·16 | 1·08 |
| Brisbane ... ... | 3·60 | 65 | 6·17 | 2·46 |
| Childers ... ... | 2·55 | 21 | 6·65 | 0·63 |
| Crohamhurst ... | 4·25 | 23 | 6·38 | 4·21 |
| Esk ... ... ... | 2·96 | 29 | 5·43 | 3·62 |
| Gayndah ... ... | 2·75 | 45 | 5·76 | 2·82 |
| Gympie ... ... | 3·07 | 46 | 3·80 | 5·19 |
| Glasshouse M'tains | 3·44 | 8 | 2·28 | 1·72 |
| Kilkivan ... ... | 2·51 | 37 | 3·44 | 1·13 |
| Maryborough ... | 3·02 | 45 | 6·60 | 1·25 |

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | Nov. | No. of Years' Records. | Nov., 1916. | Nov., 1915. |
| *South Coast*—continued: | In. | | In. | In. |
| Nambour ... ... | 3·44 | 20 | 4·21 | 4·18 |
| Nanango ... ... | 2·39 | 34 | 7·34 | 1·59 |
| Rockhampton ... | 2·08 | 29 | 3·33 | 2·62 |
| Woodford ... ... | 2·92 | 29 | 5·53 | 2·74 |
| *Darling Downs.* | | | | |
| Dalby ... ... | 2·47 | 46 | 7·59 | 0·82 |
| Emu Vale ... ... | 2·38 | 20 | 4·85 | 0·03 |
| Jimbour ... ... | 2·30 | 28 | 0·91 | 5·74 |
| Miles ... ... | 2·27 | 31 | 7·28 | 0·69 |
| Stanthorpe ... | 2·74 | 43 | 2·89 | 0·14 |
| Toowoomba ... | 3·13 | 44 | 7·48 | 1·34 |
| Warwick ... ... | 2·48 | 29 | 5·22 | 0·05 |
| *Maranoa.* | | | | |
| Roma ... ... | 2·04 | 42 | 6·42 | 0·99 |
| *State Farms, &c.* | | | | |
| Bungeworgorai ... | 2·16 | 4 | 6·84 | 0·55 |
| Gatton College ... | 2·41 | 17 | 4·96 | 0·76 |
| Gindie ... ... | 1·79 | 17 | 4·90 | 1·01 |
| Hermitage ... | 2·16 | 10 | 5·60 | 0·09 |
| Kairi ... ... | 2·06 | 4 | 5·64 | ... |
| Kamerunga ... | 1·77 | 4 | 2·55 | 1·82 |
| Sugar Experiment Station, Mackay | 2·44 | 19 | ... | ... |
| Warren ... ... | 2·31 | 4 | 4·59 | 5·22 |
| | | | | 2·98 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for November this year and for the same period of 1915, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
Divisional Officer.

# ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

## TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON FOR THE FIRST FOUR MONTHS OF 1917.

| Date. | JANUARY. | | FEBRUARY. | | MARCH. | | APRIL. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 4·57 | 6·46 | 5·21 | 6·41 | 5·41 | 6·19 | 5·58 | 5·46 |
| 2 | 4·58 | 6·46 | 5·22 | 6·41 | 5·41 | 6·18 | 5·59 | 5·45 |
| 3 | 4 59 | 6·46 | 5·23 | 6·40 | 5·42 | 6·17 | 5·59 | 5·44 |
| 4 | 4·59 | 6·46 | 5·24 | 6·40 | 5·43 | 6·16 | 6·0 | 5·43 |
| 5 | 5·0 | 6·46 | 5·25 | 6·39 | 5·44 | 6·15 | 6·0 | 5·42 |
| 6 | 5·1 | 6·47 | 5·25 | 6·39 | 5·45 | 6·14 | 6·1 | 5·41 |
| 7 | 5·2 | 6·47 | 5·26 | 6·38 | 5·45 | 6·13 | 6·1 | 5·39 |
| 8 | 5·3 | 6·47 | 5·27 | 6·37 | 5·46 | 6·12 | 6·2 | 5·38 |
| 9 | 5·3 | 6·47 | 5·28 | 6·36 | 5·46 | 6·11 | 6·2 | 5·37 |
| 10 | 5·4 | 6·48 | 5·29 | 6·35 | 5·47 | 6·10 | 6·3 | 5·36 |
| 11 | 5·5 | 6·48 | 5·29 | 6·35 | 5·47 | 6·9 | 6·3 | 5·35 |
| 12 | 5·6 | 6·47 | 5·30 | 6·34 | 5·48 | 6·8 | 6·4 | 5·34 |
| 13 | 5·6 | 6·47 | 5·31 | 6·33 | 5·48 | 6·7 | 6·4 | 5·33 |
| 14 | 5·7 | 6·47 | 5·32 | 6·32 | 5·49 | 6·6 | 6·5 | 5·32 |
| 15 | 5·8 | 6·47 | 5·32 | 6·32 | 5·49 | 6·5 | 6·5 | 5·31 |
| 16 | 5·9 | 6·47 | 5·33 | 6·31 | 5·50 | 6·3 | 6·6 | 5·30 |
| 17 | 5·9 | 6·47 | 5·34 | 6·30 | 5·50 | 6·2 | 6·6 | 5·29 |
| 18 | 5·10 | 6·47 | 5·35 | 6·29 | 5·51 | 6·1 | 6·7 | 5·28 |
| 19 | 5·11 | 6·47 | 5·35 | 6·28 | 5·51 | 6·0 | 6·7 | 5·27 |
| 20 | 5·12 | 6·46 | 5·36 | 6·28 | 5·52 | 5·59 | 6·8 | 5·26 |
| 21 | 5·13 | 6·46 | 5·37 | 6·27 | 5·52 | 5·58 | 6·8 | 5·25 |
| 22 | 5·13 | 6·46 | 5·37 | 6·26 | 5·53 | 5·57 | 6·8 | 5·24 |
| 23 | 5·14 | 6·45 | 5·38 | 6·25 | 5·53 | 5·56 | 6·9 | 5·23 |
| 24 | 5·15 | 6·45 | 5·38 | 6·24 | 5·54 | 5·55 | 6·9 | 5·23 |
| 25 | 5·16 | 6·45 | 5·39 | 6·23 | 5·54 | 5·54 | 6·10 | 5·22 |
| 26 | 5·16 | 6·44 | 5·39 | 6·22 | 5·55 | 5·52 | 6·10 | 5·21 |
| 27 | 5·17 | 6·44 | 5·40 | 6·21 | 5·55 | 5·51 | 6·11 | 5·20 |
| 28 | 5·18 | 6·43 | 5·40 | 6·20 | 5·56 | 5·50 | 6·11 | 5·19 |
| 29 | 5·19 | 6·43 | ... | ... | 5·57 | 5·49 | 6·12 | 5·18 |
| 30 | 5·19 | 6·42 | ... | ... | 5·57 | 5·48 | 6·12 | 5·18 |
| 31 | 5·20 | 6·42 | ... | .. | 5·58 | 5·47 | ... | ... |

The Phases of the Moon commence at the times stated in Queensland, New South Wales, and Victoria only.

| | | H. | M. | |
|---|---|---|---|---|
| 8 Jan., | ○ Full Moon | 5 | 42 | p.m. |
| 16 „ | ☽ Last Quarter | 9 | 42 | „ |
| 23 „ | ● New Moon | 5 | 40 | „ |
| 30 „ | ☾ First Quarter | 11 | 1 | a.m. |

There will be a total eclipse of the moon on 8th Jan. before it rises in Queensland, but the moon will still be partly in the shadow of the earth for about three-quarters of an hour after it becomes visible. It will be farthest from the earth on the 9th January, and nearest on the 23rd.

| | | | | |
|---|---|---|---|---|
| 7 Feb., | ○ Full Moon | 1 | 28 | p.m. |
| 15 „ | ☽ Last Quarter | 11 | 53 | a.m. |
| 22 „ | ● New Moon | 4 | 9 | „ |

It will be farthest from the earth on the 6th Feb., and nearest on the 21st.

| | | | | |
|---|---|---|---|---|
| 1 Mar. | ☾ First Quarter | 2 | 43 | a.m. |
| 9 „ | ○ Full Moon | 7 | 58 | „ |
| 16 „ | ☽ Last Quarter | 10 | 33 | p.m. |
| 23 „ | ● New Moon | 2 | 5 | „ |
| 30 „ | ☾ First Quarter | 8 | 36 | „ |

It will be farthest from the earth on the 5th about midnight, and nearest on the 21st about 7 p.m.

| | | | | |
|---|---|---|---|---|
| 7 Apr. | ○ Full Moon | 11 | 49 | p.m. |
| 15 „ | ☽ Last Quarter | 6 | 12 | a.m. |
| 22 „ | ● New Moon | 12 | 1 | „ |
| 29 „ | ☾ First Quarter | 3 | 22 | p.m. |

It will be farthest from the earth on the 2nd and on the 30th, and nearest on the 18th.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset may be roughly arrived at by adding 17 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

On account of the alteration of Civil (Clock) Time which took place on 1st January, it is necessary to *add one hour* to all the times given on this page.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

# Farm and Garden Notes for January.

FIELD.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish Blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye, and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole.

KITCHEN GARDEN.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw, grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflowers, mustard, cabbage, celery, radish, for Autumn and Winter use. Sow celery in shallow, well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower beds gay and attractive during the Autumn and Winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotten leaves. Fill the boxes with the compost, then sow

thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle life them gently one by one with a knife or a zinc label—*never pull them up by hand*, as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Then prick them out into beds or boxes of very light soil containing plenty of leaf mould. Then keep a sharp lookout for slugs and caterpillars. Keep a supply of tobacco dust on hand, and scatter this in the path of the slug, and he will cease from troubling you.

All kinds of shrubby plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to over water at this season. Propagate verbenas, not forgetting to include the large scarlet Fox-hunter. Verbenas require rich soil. Palms may be planted out this month. If the weather prove dry, shade all trees planted out. With seed boxes, mulch, shade, water, and kerosine spray, all of which imply a certain amount of morning and evening work, the flower garden in Autumn and Winter will present a charming sight, and will afford light and profitable work for girls with spare time on their hands.

An exhaustive booklet on "Flower Gardening for Amateurs" has been issued by the Department of Agriculture and Stock, and may be obtained from the Office. Price, 2s.

# Orchard Notes for January.

## THE SOUTHERN COAST DISTRICTS.

The fruit of the month in this part of the State is the grape, and its gathering and marketing will occupy the attention of growers. Care should be taken to cut the fruit when cool and dry, and if it has to be sent any distance the stems of the bunches should be allowed to wilt before the fruit is packed, as the berries will then hang on to the bunch better, and the bunch carry in better order. Select the fruit carefully, grade it, and pack firmly so that it will not bruise in transit. If to be sent long distances, pack in crates holding from four to six 6-lb. baskets. Pines will be ripening in quantity towards the end of the month. Gather before fully coloured, and, whether for Southern or local markets, pack and handle carefully to prevent bruising. Do not ship the fruit too green for the Southern markets, as doing so is apt to spoil the trade. Send good fruit to the canneries. Small pines and crippled fruit are no good to canners, and the sooner our growers realise that it only pays to grow good fruit the better for them and for the canners, as if the latter cannot get good fruit it is impossible for them to put a line of goods that will not only be a credit to the State, but for which a world-wide market can be obtained.

Passion fruit should not be allowed to lie about for days on the ground before gathering, as if so they are apt to become fly-infested.

Watermelons and rock melons are still in season.

Watch any late peaches, Japanese plums, or other fruits liable to be infested with fruit fly, and gather and destroy all infested fruit, or, better still, grub the trees out and burn them, as they only breed flies to destroy more valuable fruit. Mangoes will be ripening during the month. See that all fly-infested fruits are destroyed, as they will only breed up further crops to destroy later ripening fruits.

Citrus orchards can be cyanided during the month for scale insects, and spraying for Maori with the sulphide of soda wash should be continued where necessary.

Mangoes can be budded during the month, as well as citrus and deciduous trees. Tropical fruit trees can be transplanted, taking care to choose dull weather and to cover same from the direct rays of the sun till they have become firmly established. Pines and bananas can still be planted.

## THE TROPICAL COAST DISTRICTS.

See that all bananas are covered with netting, as the fly is usually at its worst at this time of year.

Mangoes will be going off. See that they are not allowed to remain about on the ground to breed flies for the Autumn crop of oranges. Longan, litchi, and other fruit are in season. As the month is often a

very wet one, little cultivation can be done in the orchards. Strong undergrowth should, however, be kept down with a hoe or scythe. Tropical fruits of all sorts can be planted. Look out for Maori on citrus fruits, and spray when necessary.

## THE SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Stanthorpe district, apples, pears, plums, peaches, and nectarines being in season. Do not gather the fruit too immature; at the same time, don't allow it to be over-ripe. Gather dry, handle carefully, grade and pack in attractive cases. Keep the fruit as cool as possible, and ship in well-ventilated cars. Keep a sharp lookout for fruit fly, and take every possible means to prevent its spreading, even going as far as to gather and destroy the whole of the fruit on any infected trees, as if kept in check during the month the bulk of the fruit ripening during February will be free.

Keep a sharp lookout also for codling moth, examine the bandages on the trees at least every ten days, and destroy all larvæ found therein; also gather and destroy all moth-infected fruit.

Gather Bartlett pears as soon as they are large enough, and store away in a cool shed to ripen; when they show signs of ripening, market, not before. If sent down green they will sell for cooking, and only fetch a small price. The right stage at which to gather is when the fruit is fully developed, and the flesh has lost its woody flavour, but is still quite hard. This is usually before the fly has stung it, and if gathered at this stage the fruit will ripen up properly without shrivelling, and develop its full flavour.

These remarks apply also to the Downs country, which is somewhat earlier than Stanthorpe.

The crop of the month in the Western tablelands is the grape; and the remarks I have made respecting this fruit when grown in the Southern Coast districts apply equally here. The fruit should be gathered dry, and wilted before it is packed. Too large cases are often used; cases holding from 20 to 30 lb., or crates holding six 6-lb. baskets, are preferable, the latter being the best package for shipping the fruit long distances. Keep the orchards well cultivated, and, where water for irrigation is available, give citrus trees a watering during the month, unless there has been a sufficient rainfall. When the orchard is irrigated, see that thorough cultivation follows the irrigation, so as to conserve the moisture in the soil.

Red Scale, which is prevalent on citrus trees in the dry Western country, should be treated during the month. Cyaniding is the best remedy.

QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## COTTON V. WHEAT.

A Victorian farmer, writing lately to the "Producers' Review," stated that, with a crop of 27 bushels of wheat per acre, grown and harvested under ruling union rates of wages, the net profit at 4s. 9d. per bushel on 345 acres amounted to £1,222 4s. 7d., or £3 10s. 10¾d. per acre. A wheatgrower at Warwick said that, with a return of 20 bushels per acre the profit on wheatgrowing, after paying every possible expense, was £2 4s. 1d. with wheat at 4s. per bushel. He gave as the cost per acre £2 5s. 11d., including 10s. interest.

If a Queensland farmer harvested 27 bushels per acre from 345 acres and sold at 4s. 6d. per bushel, he would realise £2,095 17s. 6d. Deducting expenses on the scale given by the Victorian farmer—viz., £2 5s. 11d. per acre, or £792 1s. 3d.—the net profit would amount to

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£1,303 16s. 3d., or, per acre, a fraction over £3 15s. 6¾d. According to the Government Statistician's figures published in 1916, the mean wheat return for this State for the past ten years was 11·39 bushels per acre. The highest average per acre was 15·81 bushels in 1912, and the lowest, 4·42 bushels in 1915. The cash value of this latter yield per acre at 4s. 6d. per bushel would be 18s. 11½d., representing a loss of 6s. 11⅛d. per acre. On 345 acres the loss would be ruinous.

Taking the highest average, that of 1912, the cash return per acre is about £3 11s. 4d., less expenses £2 5s. 11d., leaving a profit of £1 5s. 5d. per acre.

How does this compare with a crop of cotton off the same area? Taking the average yield of seed cotton at only 1,000 lb. per acre, the yield on 345 acres would amount to 345,000 lb. At 2d. per lb., the gross return would be £2,875, and the expenses £2 16s. 11d. per acre, made up as follows:—First ploughing, 4s.; second ploughing, 3s.; first harrowing, 9d.; drilling, 1s.; second harrowing, 9d.; rolling (optional), 9d.; seed, 5s.; picking, at ½d. per lb., 1,000 lb., £2 1s. 8d.

The total outlay would thus amount to £981 16s. 3d., leaving a net profit of £1,893 3s. 9d., or a fraction over £5 3s. 11d. per acre.

The cotton-grower has many advantages over the wheatgrower. The only implements he needs are the usual ploughs, harrows, and seed-drill. The plant is drought-resisting. and will also stand up against heavy rain. Practically, there is no disease of the cotton plant in this State. The only trouble is, occasionally, the boll-worm; this insect can be easily controlled by planting a few rows of corn amongst the cotton, as it is the same pest which attacks the grain in the upper part of the maize cob. The cotton plant may be pruned after the crop is off, or it may be ploughed out and re-sown in the spring. If the cotton-field is within carting distance of a ginnery, no bags or bales are needed. The cotton may be put straight into a boxed-in dray, and delivered at the ginhouse weighing-machine, as is done in the cotton-growing States of America.

The cost of picking will be greatly reduced if the lately invented cotton-picking machines are placed on the market. Meanwhile, the light work is easily performed by men, women, and children. At ½d. per lb., pickers, according to their ability, can make from 8s. to 12s. per day. Expert white pickers in America can pick as much as 400 lb. in a day, in the height of the season, thus earning 16s. 8d. a day at far easier work than canecutting.

We have taken 1,000 lb. of seed-cotton as an average crop; but, in 1907, several farmers at Wallumbilla, Tallegalla, Vernon, and Mackay made crops of 2,000, 1,700, 1,500, 1,300 lb., the value per acre being from £8 11s. to £11 13s. A 2,000-lb. crop adds little or nothing to the expense except £2 1s. 8d. for picking the extra quantity.

With the revival of cotton-growing in Queensland, the establishment of ginneries will naturally follow. Ginning in a good cotton district is a profitable business both for the ginowner and the farmer, as the latter can get rid of his crop practically at his own door.

Taking the yield of lint from 1,000 lb. of seed-cotton as 400 lb. and of seed as 600 lb., the result from 345 acres would be 138,000 of lint and 207,000 lb. of seed.

| | |
|---|---|
| At 10d. per lb., the average price of cotton in the British market in December, 1916, this is worth .. .. | £5,750 |
| 92½ tons of seed at £6 per ton .. .. .. .. | 561 |
| | £6,311 |

In addition to this, the woolly seeds of Upland cotton are passed through a special gin, which removes all the short lint, amounting to about 30 lb. per 600 lb. of seed. Thus the seed produced on 345 acres furnishes 10,350 lb. of the short cotton known as "linters," which sells at about £9 per ton, and adds £36 to the gin return, making a total return of lint of £6,347. The expenses of working the ginnery are:—

| | £ | s. | d. |
|---|---|---|---|
| Ginning for long lint, at ¼d. per lb. .. .. .. | 359 | 7 | 6 |
| Second ginning for linters, including wages, oil, &c. .. | 10 | 0 | 0 |
| Loss in weight owing to impurities in the seed-cotton, 5 lb. per 100 lb. of clean lint, 6,900 lb. .. .. | 287 | 10 | 0 |
| 345 bales for long lint, at 4s. 2d. each .. .. .. | 71 | 17 | 6 |
| 6 bales for linters, at 4s. 2d. each .. .. .. | 1 | 5 | 0 |
| Bailing and pressing .. .. .. .. .. | 35 | 0 | 0 |
| | £765 | 0 | 0 |
| Purchase of seed-cotton, at 2d. per lb. .. .. | 2,875 | 0 | 0 |
| | £3,640 | 0 | 0 |

Net profit, £2,707.

## THE COTTON CROP OF 1916.

The total quantity of cotton dealt with at the last ginning by the Department of Agriculture and Stock on the growers' account was 29,230 lb., from which there was obtained 10,066 lb. of lint, 18,284 lb. of seed, and 880 lb. of waste. The number of pounds of raw cotton required to produce 1 lb. of lint was 2·904 lb., and for 1 lb. of seed 1·6 lb. The percentage of lint to raw cotton was 34·4 per cent., and 1 lb. of raw cotton produced ·344 lb. of lint. The lint was sold locally at an average gross sale price ex store of 6·9d. per lb., the price obtained for the best lint being 7d. per lb. The seed was purchased by the Department for redistribution for planting, and after deducting ginning expenses the growers received a net return of 2·54d. per lb. of raw cotton, which, at the low average of 1,000 lb. of raw cotton to the acre, is equal to £10 11s. 8d. an acre.

Inquiries show that the average cost of planting, cultivating, and harvesting a crop of 1,000 lb. of cotton, per acre, is £2 16s. 11d. Thus the net return to the grower is £7 14s. 9d. per acre. Given a 1,500 or

2,000 lb. crop, such as has often been obtained in Queensland, the farmer's profit is still greater, as the only additional expense is that of picking the extra 500 lb. or 1,000 lb. of raw cotton. In the days of the civil war in America there were 14,000 acres under cotton in Queensland, and the farmers were paid 3d. per lb. for Uplands cotton. This paid them better than any other crop they could grow. To-day the farmers who sold their cotton to the Department of Agriculture at 1¾d. per lb. have realised nearly 3d. per lb. since the cotton was sold. This compares well with maize and wheat growing, especially wheat, of which the highest average yield for the past ten years was 15·81 bushels in 1912, and 4.42 bushels in 1915.

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## QUEENSLAND GUANO.

For a long series of years, supplies of guano were obtained from the Chincha Islands, off the coast of Peru. These barren islands, three in number, were covered with a deep deposit of guano, the deepest being about 300 ft. The guano was mined from the sea-level upwards. When we visited the place in 1860, there were at least 1,000 ships, all sailing vessels, loading or waiting to be loaded. In those days a ship was allowed about 100 laying days before she could begin taking in cargo. The trade has long since vanished, the guano deposits being exhausted, and no more is obtainable for export. We find, from an article in the "Brisbane Courier," that large quantities of bat guano exist in the caves in the neighbourhood of Rockhampton. The article says:—

"Mount Etna and the adjoining ridges are situated about 16 miles north from Rockhampton. The mountain and spurs consist of blue-grey limestone, and in the centre of the mountain sides are numerous caves and winding tunnels. The roof is white limestone, like slabs of polished marble. Over forty of these caves have been discovered, and myriads of bats have made them their home. Large deposits of guano have partly filled the caves, and in many instances the deposit is at least 20 ft. deep. It is here that the Mount Etna Caves become commercially interesting. The value of guano is well recognised the world over. A Sydney company, the Guano Fertilisers, Limited, has recently purchased the machinery, plant, and lease of the Mount Etna Caves. Skips have been laid to take the guano from one chamber to another, and to the hoist to be raised through the shaft to the side of the mountain. The guano is then conveyed by wire cable to the factory, where it passes through rotary screens, and the coarser material is elevated to pass through a crusher, which reduces it to powder. The factory is less than a mile from Phosphates Siding, on the main line. A motor tractor will be used to convey the guano from the factory to the railway trucks. Already large orders from New South Wales and New Zealand are reported. The Queensland agency has been entrusted to the Australian Co-operative Fertilisers, Limited, Roma street, and stocks will be available very shortly."

## HARVESTING SUNFLOWER SEED.

Harvesting is effected either by cutting the heads of standing plants or by cutting or uprooting the plants, and in any case should be done before the seeds are quite ripe, so as to avoid loss of seed. The heads are dried to prevent them becoming mouldy, and the seed is removed either by holding the heads against a revolving cylinder studded with spikes or by special machinery. A simple and easily made device consists of a strong wooden disc about 2 in. thick and 3 ft. in diameter bound by a stout iron rim and worked by a pedal and crank (or by a belt if power is available). It is mounted in a similar fashion to an ordinary grindstone. Stout nails are driven through the disc parallel to the axis and near the periphery, and are allowed to project about ½ in. on each side. A band about 6 in. wide is formed in this way, in which the nails are not more than about ½ in. apart. The seeds are removed by holding the flower head against the nails while the disc is in motion. The seed can be separated from dried florets and other light impurities by winnowing, and should be carefully dried in order to prevent fermentation during storage.—"Cyprus Journal of Agriculture."

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## A NEW CROP FOR QUEENSLAND.

The introduction of new commercial crops is a matter which the Department of Agriculture and Stock has had under consideration for some little time. Inquiries have elicited the fact that prices for flax (linseed) of commerce, like many other primary products, have materially advanced, and reached a stage when it should be remunerative to the grower, provided anything like a normal season is experienced.

There is no question about the ability of the plant to thrive, particularly within the coastal belt on the free-working alluvial types of soils from the Burnett to the Tweed; also on similar classes of country on the Downs close to the Range, where a good rainfall is to be expected. Experiments at State farms and the Agricultural College have proved that flax finds a congenial home here. At present no machinery is available in Queensland to treat the plant for its highly valuable fibre, but present and prospective prices indicate that the growing of the crop in the meantime, for its seed alone, will be a sufficient inducement for farmers to take the matter up.

The cultivation and successful raising of the crop present no difficulties; seeding, harvesting, and threshing can be effected with labour-saving machinery.

The principal firm of linseed oil and cake manufacturers, Messrs. Meggitts, Limited, of Parramatta, New South Wales, advise that: "As far as an assurance to Queensland farmers that a satisfactory market would be obtained locally is concerned, we would say that no fear need be felt, at all events for some years. This year we consumed over 9,000 tons, and we estimate our requirements for next year at well over

12,000." . . ."Referring to the probable market price, this is somewhat difficult to forecast. Calcutta seed ranges from £11 per ton to as high as £18 per ton, c.i.f. and e. Sydney, and we should base the price we would pay Australian growers on the price ruling for Calcutta seed at the time of purchasing, taking into consideration the difference, if any, between the yield of oil in the Calcutta seed and in the Australian. We should think it probable that Australian seed would be worth, approximately, judged by its oil contents, £1 per ton less than Calcutta seed."

The present shipping charges, Brisbane to Sydney, aggregate £1 8s. per ton, or 8 2/5d. per bushel; rail freight, cartage, &c., at this end would need to be added.

The Department of Agriculture has made arrangements to secure a supply of seed to meet the anticipated demand.

Persons requiring seed should register their names as early as possible with the Under Secretary for Agriculture, Brisbane. Prior to the despatch of the seed, notification will be sent to applicants in order that the necessary remittance (with exchange) may be forwarded.

Price of seed, 6s. 6d. per bushel, f.o.b. Brisbane.

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## SOME NOTES ON GROWING FLAX (LINSEED).

### SOIL.

Flax can be successfully raised in a fairly wide range of soils; those of a free-working, loamy nature, alluvial in character, are very suitable. Well-prepared new land is also to be preferred on account of its freedom from weeds, flax being a poor weed-fighter.

The soil should be prepared well in advance of the planting season, and kept in good tilth until ready to plant. Thorough cultivation ensures a plentiful supply of plant food and moisture, and better prospects of higher yields.

### TIME TO PLANT.

Sowings can be made during May and June; the latter date will in all probability be found the most suitable for localities below the range.

### METHOD OF PLANTING.

The crop can either be drilled in or broadcasted. For the former method, the grass-seeding attachment on the wheat-drill can be used. In the event of the drill not being fitted with such, the seed can be mixed with about twice its bulk of sifted sawdust and sown similarly to wheat. The depth to be covered will depend somewhat upon the type of soil and the amount of moisture present. A depth of over 2 in. is not recommended.

## SEED REQUIRED PER ACRE.

This plant does not stool. When sown for fibre, a long, straight stalk is required, which is induced by thick seeding. In growing the crop for grain, a thinner seeding must be made, so as to encourage branching and seed-production.

In drilling, 40 to 50 lb. of seed is sufficient to plant an acre. In broadcasting, 60 to 70 lb. would be necessary.

Plump, well-developed seed should only be sown; thin, scaly seed should be avoided.

## HARVESTING.

This can be carried out in several ways, but most expeditiously with the reaper and binder.

Great care must be taken not to allow the crop to fully mature before cutting, otherwise shelling would result, and a large percentage of the seed would be lost.

It will generally be found necessary to stook the sheaves for about a fortnight before threshing out the grain or placing it in a stack. Threshing out of "stock" is to be preferred. To save loss of seed when handling, spread tarpaulin or bag-sheeting over dray or wagon.

## THRESHING OUT.

A special machine is required when threshing the crop for its fibre. When only the seed is to be secured, the ordinary type of wheat-thresher will answer the purpose, sieves being fitted to suit the size of the seed. A small peg-drum thresher can also be used, or a simple power-driven device consisting of two wooden rollers about 2 ft. in diameter. The top roller—resting upon the bottom—should be fitted with slotted bearings to allow a perpendicular play of about 2 in. The weight of the roller is sufficient to crush the husk, allowing the seed to fall out.

The sheaves can also be left intact by supporting the top roller at one end on a long bearer, thus permitting the sheaves fed from the end of the rollers to pass through sideways. Only the "seed end" of the sheaf need pass through.

The seed when cleaned should be placed in sound bags of close texture.

Under favourable conditions a yield of from 14 to 20 bushels per acre may be expected.

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## ENCOURAGEMENT TO COTTON-GROWING IN INDIA.

It is stated in an article in the "Indian Trade Journal," on Cotton-growing in India, that the short-staple cotton yielding a heavier out-turn per acre than the indigenous long staple was first introduced in various places with the idea of mixing the short and long staple together. After watering, the mixture is practically indistinguishable from long-staple cotton until it is actually brought into use in the spinning mills. For a time the mixture fetched the same prices as long staple; but once the

practice became generally known, prices were noticeably reduced. In districts where long staple was grown, short staple was actually imported by rail to be mixed and watered with the local cotton. If no steps had been taken to check this tendency, every district would have lost its reputation as a cotton-producer. The deterioration of Hyderabad cotton resulted in a loss to the ryot (peasant farmer) of 5 rupees per acre, with the probability of a heavier loss in the near future. To remedy this state of affairs, farms were opened for the cultivation of pure long-staple and for provision of seed, but this was not enough. At first the ryots refused to use the seed from the farms until the Agricultural Department agreed to buy their kapas (seed cotton) grown from seed distributed by the farms and to hand over the profits to the ryots. This was done for one year, with the result that the demand for seed increased from 2,000 acres to 20,000 in the second year. The mill agents, now assured of long staple, are offering Rs. 10 more per kandi of 240 seers. There are thus very good grounds for hoping that the restoration of the indigenous long staple will be successful. Taking the average area under cotton in Mahratwara, it is believed that the ryots will be benefited to the extent of at least one crore of rupees. If these hopes are realised, the benefits which the Agricultural Department will have conferred on the State in the short period of its existence are exteremely remarkable.

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## EXTENDING THE CULTIVATION OF COTTON IN EASTERN BRAZIL.

Two important influences are operative in Brazil to bring about as large and as speedy an extension of cotton cultivation in that country as possible. The first is peculiar to Brazil itself, being the embarrassment caused to the domestic textile industry by the failure of the Brazilian cotton crop a year ago and the consequent very high prices attained by the staple. The second influence is the enormous increase in the market value of all kinds of cotton all over the world. Brazil is naturally a cotton-growing and cotton-exporting country; and those concerned with the economic welfare of the nation see in the very large returns obtainable from producing cotton at existing prices the strongest of inducements to push cotton-growing in every possible way. Various statements of Brazilian projects to this end have appeared in recent months in the pages of this paper. To these may be added a report lately made to Washington by United States Consul-General Alfred L. M. Gottschalk, Rio de Janeiro, as published in "Commerce Reports." Mr. Gottschalk says—

"By a decree dated 5th August, 1916 (Law No. 1161, State of Bahia), the local government of the State of Bahia offers the gratuitous use for the space of five years of certain State lands to individual cotton-growers, either native or foreign, or to persons who, not being agriculturists themselves, are desirous of founding colonies of agriculturists who would raise cotton. *At the end of this period the full title to the lands would revert to the individual planter in the first case, or, in the*

*second case, to the person who had formed the colony.* In the event, however, that the lands be not under proper culture at the end of the prescribed five years, the lands would revert to the State of Bahia. The State Government of Bahia also offers facilities in the way of distributing seeds, and promises to engage one or more specialists to instruct cotton-growers as to planting methods and the quarantine of blights and other diseases."—"Cotton and Cotton Oil News."

[The Queensland Department of Agriculture offers to supply pure seed to farmers willing to grow cotton, give them all necessary instruction, and purchase their crops when harvested. Yet the response is poor, and a more payable industry than wheat, sugar, or maize hangs fire.—Ed. "Q.A.J."]

## THE OUTLOOK FOR COTTON.

A report on the present position of the American cotton market, and the prospects for the future, appeared in the "Cotton and Cotton Oil News," of 27th November. The report emanates from a cotton-broking firm at New Orleans, Louisiana, and reads as follows:—

"From every State comprising the cotton belt have come reports of the largest spot merchants competing for offerings, and with the demand emanating from such sources all doubt has been dispelled as to the underlying strength of the raw material.

"The fact of the matter is that as the season grows older and the cotton gradually disappears from the points of concentration, those short of their requirements are having it forcibly brought home to them that the year's growth is much below what the world actually needs. And while in peaceful times it would be relatively easy to square demand and supply through the agency of a sharp advance in prices, the great wastage of raw cotton and cotton goods occasioned by the war automatically creates such a demand for these commodities that they must be had, no matter what their cost, while any supply is available. Viewed from any standpoint, we can see no chance of a permanent decline in the price of raw cotton; on the contrary, we believe it will continue to advance until either a surplus crop is produced or the war terminates."

## COTTON PLANTS AS A MANURE FOR BANANAS.

An interesting experiment has been conducted in Fiji which consists in growing cotton before bananas as organic manure. Cotton-seed was sown at the rate of 6,720 lb. per acre, and when the young plants had reached an average height of 9 to 10 in. they were ploughed under. The total weight of the bananas produced in the plot manured in this way was 454 lb. compared with 282 lb. in the case of the control. The cotton-seed, therefore, seems to have had some effect.—"Agricultural News of Barbados."

# Pastoral.

## PRICKLY-PEAR STOCK-FEEDING EXPERIMENTS AT WALLUMBILLA.

The undermentioned report has been presented to the Hon. Wm. Lennon, Minister for Agriculture, by the Prickly-pear Board appointed to control the experiments.

The information represents a summary only of deductions drawn from initial "maintenance" tests, and has been compiled from progress reports furnished by the chemist in charge of the station, Mr. Frank Smith, B.Sc., F.I.C., who has been deputed to present full data of the experiments for publication.

Two animals were slaughtered in the interests of the experiment. Particulars as to the effect of a pear diet, gained by *post mortem* examination, have been furnished by Mr. Adam McGown, M.R.C.V.S., and are attached as an addendum to the present report.

Experiments in feeding sheep commence in January.

The knowledge already gained from the "maintenance" trials with steers will be adapted for dairying operations, which will be initiated early this year.

MEMBERS OF PRICKLY-PEAR BOARD.

A. H. Cory, M.R.C.V.S., Chief Inspector of Stock.
J. C. Brünnich, F.I.C., Agricultural Chemist.
A. E. Graham, Chief Dairy Expert.
H. C. Quodling, Director of Agriculture.

PRICKLY-PEAR STOCK-FEEDING AT WALLUMBILLA.
OBJECT: PEAR UTILISATION.

1. As a drought stand-by for cattle and the preservation of herds.
2. To determine the exact requirements of animals when fed with pear. How to feed pear and what minimum of added food is necessary in conjunction to enable animals *to live, also to thrive.*
3. Water requirements: Whether water is necessary or harmful.
4. Physiological effect of pear diet.

Maintenance tests were carried on for six months with eighteen young bullocks.

Certain deductions were made which have an intimate bearing on the question.

Animals had to be quietened and taught to feed, and it is estimated that several beasts lost up to 80 lb. weight each in condition before settling down to pear-feeding.

Those fed exclusively on pear up to their maximum consumption, 62 lb. per day, gradually wasted, as there was insufficient nutriment in this amount to maintain life for more than strictly limited periods; the practice of feeding on pear alone had to be discontinued to save the animals' lives. However, when fed with small amounts of other food, lucerne chaff or oilcake, they promptly improved.

Machine-sliced pear proved as acceptable to stock as boiled pear.

It was found unnecessary to singe either the spines or prickles prior to slicing and feeding. The only preparation found necessary was to pass the pear through a power-driven slicer.

## FOOD VALUE OF PEAR.

This has been proved, as a food, to be equal to many root crops—mangolds, &c.—commonly used elsewhere. It is obvious that pear can be handled and fed to stock at a cost much below that of cultivated crops.

The animals under experiment failed to consume, even in the case of the heaviest pear-eaters, more than 90 lb. per day. The average daily consumption of pear per capita was less than this amount; and naturally the animals suffered a deficiency in nourishment and rendered it imperative to add nutrients to compensate for the shortage of protein in the ration.

In the cases under review it was proved that by the addition of a few pounds (3 to 3½) of lucerne chaff or a lesser poundage of linseed oil cake (2 to 2½ lb.), procured at the present cost of slightly over 2d. per head per day, the thriftiness of the animals was restored, and they gained body weight at the rate of one-third of a pound per head per day, and this applies to the coldest period of the year. With the advent of warmer weather and when fed rations similarly constituted, as far as the value of concentrates is concerned (2d. per head per day), certain animals, the more lavish pear-consumers, improved sufficiently in condition to be fit for beef purposes, and individuals gained in flesh to the extent of ½ lb. per day.

Two beasts used in the feeding tests were sold to a local butcher and slaughtered under veterinary supervision to determine the effect of an almost exclusive pear diet, and these proved to be quite satisfactory for beef purposes, and carried a light though even distribution of fat, the carcass weights being 664 and 652 lb. respectively. The veterinary surgeon's (Mr. A. McGown) attached report shows that with the exception of a minor ulceration of tongue, palate, and stomach, the animals were otherwise remarkably healthy and free from any general inconvenience attributable to a pear ration. There was, however, distinct evidence throughout to show that the mucous membranes of the various digestive organs had become thickened, the result of irritation, but no lesions of a serious nature were found. No fibre had accumulated in the stomachs of the animals, and its absence may be accounted for in a measure by the fact that the pear was sliced before being fed.

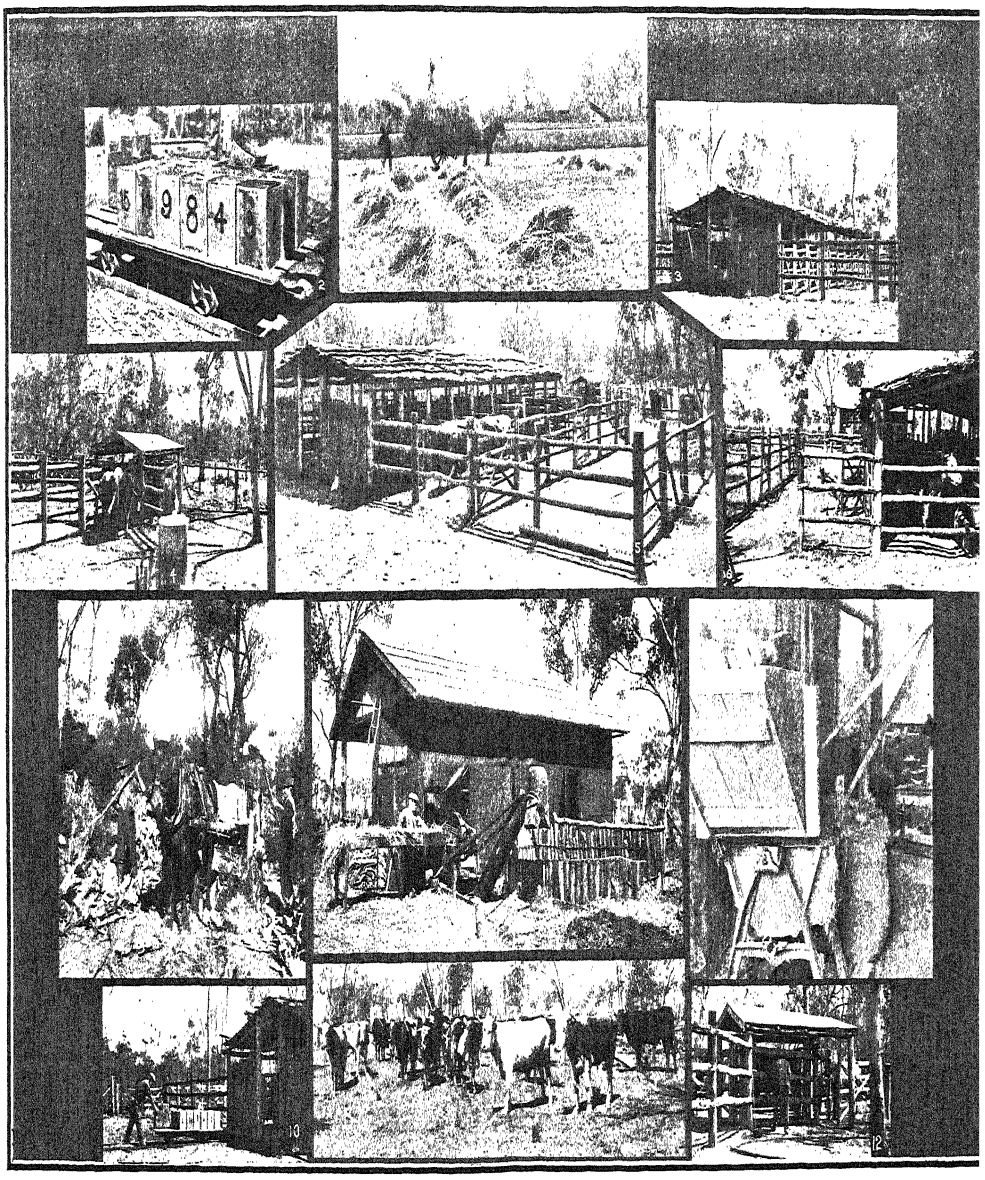


PLATE 4.—VIEWS AT PRICKLY-PEAR STOCK-FEEDING EXPERIMENT STATION, WALLUMBILLA.

Results demonstrate the feasibility of promoting advancement in condition of animals with pear as a sole roughage, and feeding trials proved in the case of those beasts which consumed pear freely (70 lb. and over per day) that no useful purpose would be served by supplementing what may be termed pear roughage with ordinary hay.

## WATER REQUIREMENTS.

Ordinarily in the cool months of the year, stock do not require water, as the moisture in the pear provides sufficient.

The animals at the Pear Station did not receive any water for 150 days, but as soon as warm weather set in they exhibited a desire for water, which was provided in unlimited but measured quantities without any injurious result.

## FUTURE WORK AT THE PEAR STATION.

It is purposed to follow up the work at the Station by introducing feeding trials with five groups of sheep (ten each), to determine the effect of a pear diet on this class of stock whilst woolgrowing and when rearing lambs.

With the data at their command, as a result of the initial experiment work, it is now opportune for the Prickly-pear Board to determine the possibilities of dairying—

(*a*) Whether it is possible to profitably engage in this occupation in country thickly infested with pear.

(*b*) To ascertain whether pear country can be satisfactorily used for maintaining dairy stock in time of drought.

(*c*) To decide the most satisfactory means of doing so.

Further, the Board recognises the importance of showing whether, in times of food scarcity or drought, live stock (sheep and cattle), may be railed to pear country contiguous to the railway line and be satisfactorily maintained by feeding them with such a cheap and abundant food as pear merely by the addition of small quantities of nitrogenous food.

## REPORT BY ADAM McGOWN, M.R.C.V.S.

6th November, 1916.

SIR,—I have the honour to report that I visited Wallumbilla on the 3rd instant for the purpose of making a *post mortem* examination on two young bullocks from the Prickly-pear Stock-feeding Experiment Station which had been maintained on a pear diet supplemented by small quantities of protein-yielding food for a period of some six months.

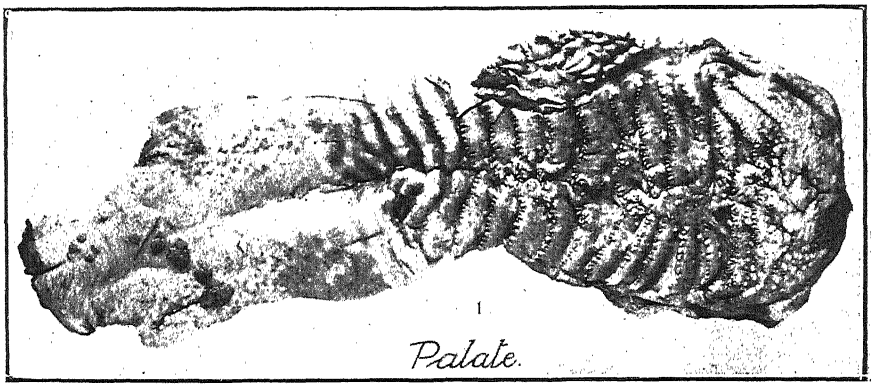
Both animals were grades between three and four years old and apparently raised from dairy stock. They appeared to be evenly though lightly fleshed, and were thrifty in appearance. A *post mortem* revealed certain features attributable to regular and constant employment of a pear diet. Its effect on various organs of the body was confirmed by a similarity of results found in each animal examined, leading to the conclusion that whenever cattle are placed in the position of having to obtain the major part of their sustenance from pear, similar changes to those enumerated are to be expected.

From inquiries made, it has been shown that the daily pear consumption of animals at the Station was not always regular, and this fact seemed to indicate that pear was unpalatable, however—an opinion borne out by *post mortem* results, shows fairly conclusively that at times the soreness due to ulceration of tongue would act as a check to mastication.

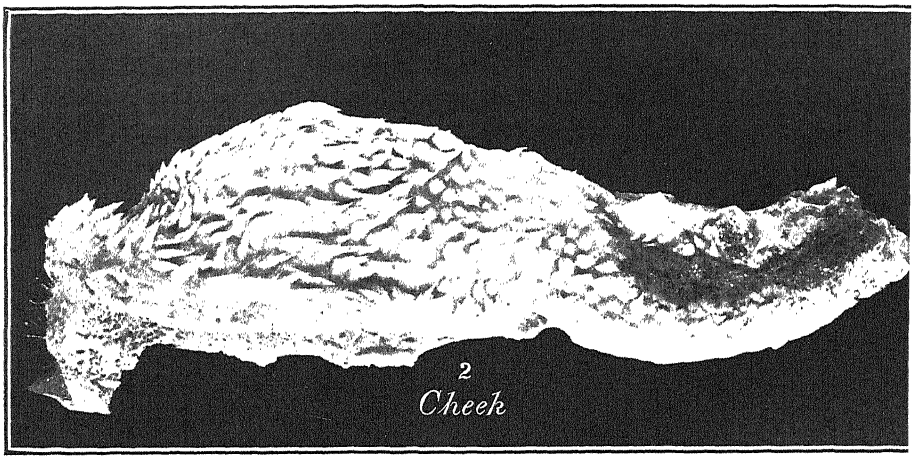
*Post Mortem: General Appearance.*—Carcass in both cases well nourished and entirely healthy. Flesh: Good colour, nicely grained, and of good quality. The fat, though not plentiful, was evenly distributed and of a good clear white colour and quality.

*Alimentary Tract.*—The changes from normal proved to be as follows:—Tongue: Mucous membrane disturbed by five ulcers in one case, and six ulcers in the other, the size of which approximated ¾ in. in diameter throughout. The sides of tongues in both instances showed the presence of several small nodules, caused by spines penetrating the membrane of the tongue, which in the ordinary course of events would have a tendency to burst, leaving a raw sore. The tongues carried a number of fine spines and prickles.

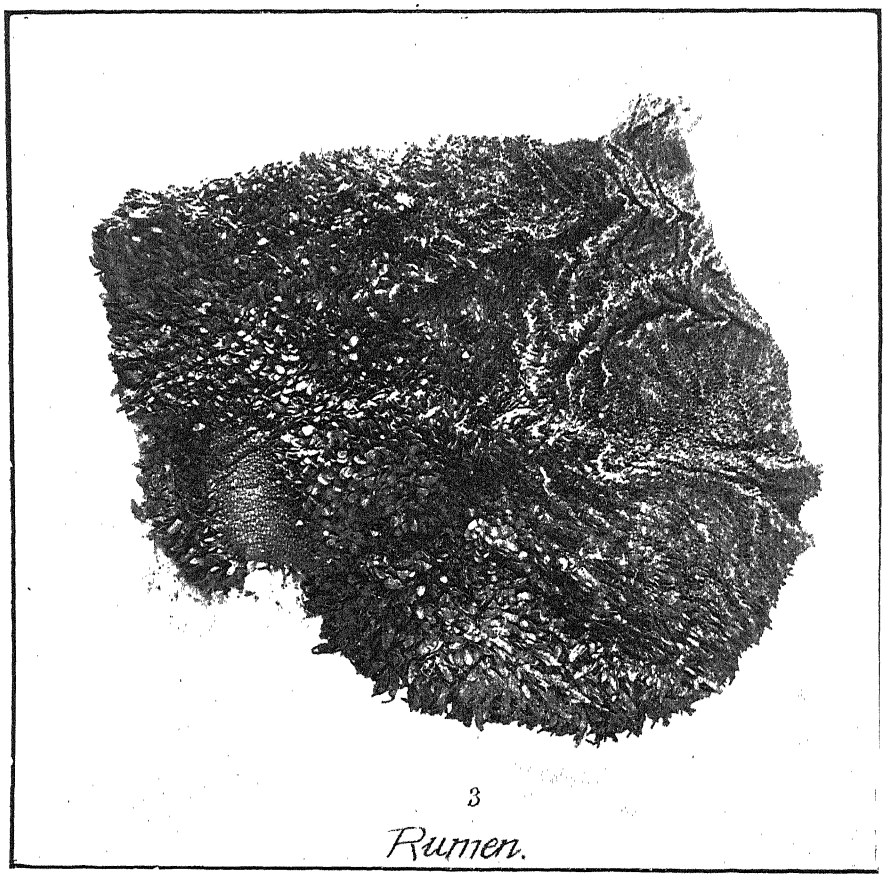
*Oesophagus.*—The mucous membrane of this organ showed no marked change, and in both instances proved to be free from prickles.



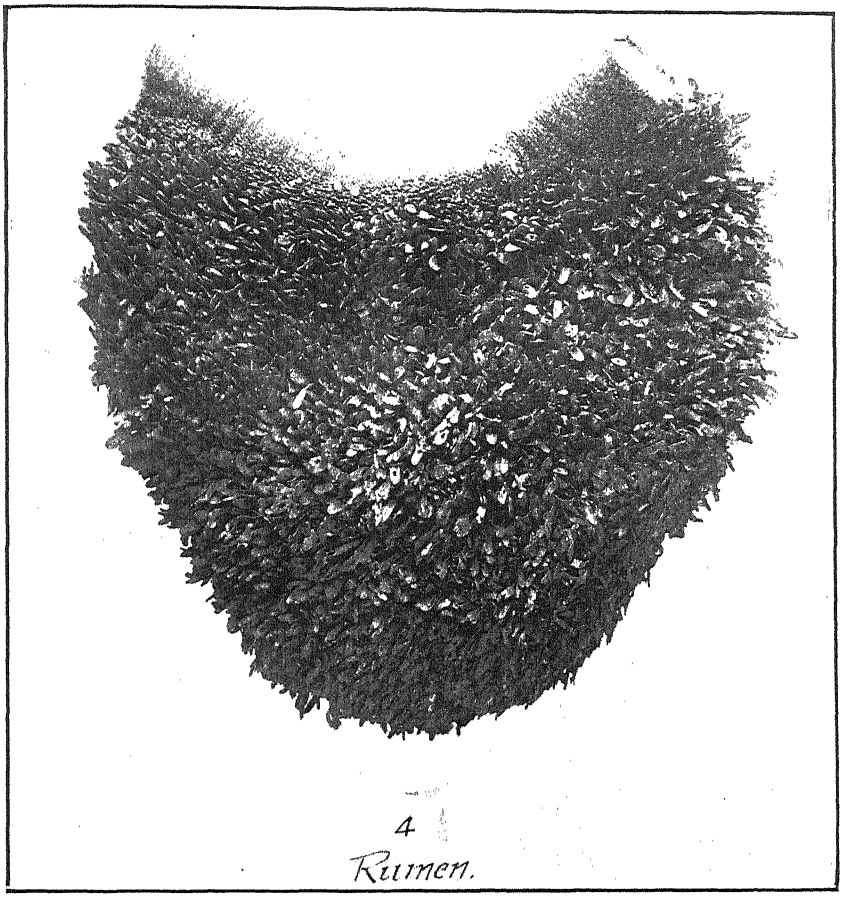

*Specimen* 1: *Palate.*—Thickened and roughened, with a few small abrasions and several small excrescences; no prickles present.



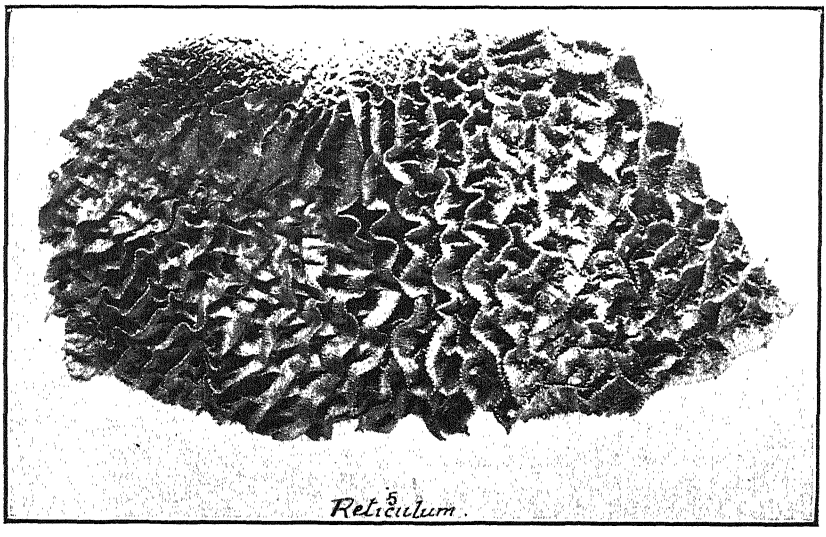

*Specimen* 2: *Cheek.*—The papillæ show an increase in size. The anterior portion of the gum of one animal was ulcerated (ulcer 1½ by ½ in. approximately), and contained a group of fine prickles.




*Specimen* 3: *Rumen.*—Mucous membrane exhibited differences, one portion being normal, whilst adjoining it the papillæ were increased in size and in length and thickness.



4
Rumen.

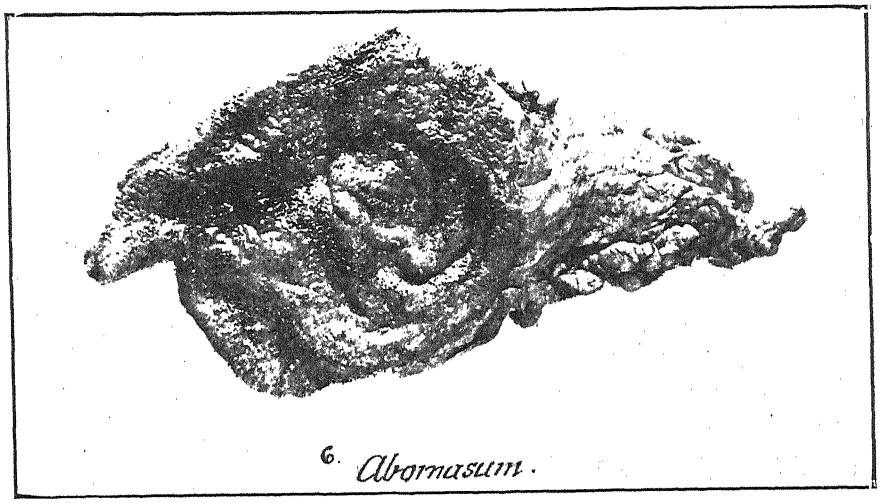


5
Reticulum.

*Specimen* 4: *Rumen.*—All the mucous membrane showed a regularity in condition—viz., the papillæ covering the membrane were also increased in size and gave evidence, in a few instances, of small perforations apparently from pear spines.

*Specimen* 5: *The Reticulum.*—Mucous membrane much thickened and toughened in both animals, and showed at one portion a tendency to ulceration.

*Omasum.*—In both cases showed no marked change from normal.



6. Abomasum.

*Specimen* 6: *Abomasum.*—In both animals the mucous membrane was greatly thickened throughout; a portion of the membrane in each instance was covered with colonies of fine prickles embodied in the membrane. These (prickles) were apparently unaffected by the digestive fluids.

*Contents of Stomach.*—Quite fluid, due to the large percentage of moisture in the pear fed to the animals. No fibre present.

*Summary.*—The *post mortem* appearances indicate that animals can assimilate a pear diet and thrive, provided it is presented to them after passing the pear through some form of slicing or pulping machine to break down the spines or prickles present.

It is evident also that the animals examined received a sufficiency of supplementary flesh-forming (nitrogenous) food to properly nourish their systems and build up their tissues satisfactorily.

The Chief Inspector of Stock, Brisbane.

## SHEEP ON COASTAL AREAS.

The various articles which have been written for this Journal, on the advisability of raising sheep of certain breeds on our coast lands by the help of artificial grasses, have been the means of establishing many thriving flocks on lands where, in years gone by, sheep proved a failure. We have received the following letter addressed to the Under Secretary for Agriculture by a gentleman at Nebo, under the pen name of "Malabar":—

"I have been much interested in the articles on 'Coastal Sheep,' and I think Mr. W. G. Brown and the department are to be congratulated on their enterprise in drawing the attention of coastal farmers generally to the possibility of establishing such a suitable and profitable industry as sheep, and particularly fat lamb raising on small areas near the market, and adapted to small purses. If, as advised, farmers who know nothing of sheep, buy small lots for a start, or even confine themselves to fattening little lots of store wethers (even merino wethers on artificial grasses will pay for fattening), they can make a handsome and interesting addition to their work and incomes. About twenty-five years ago I spent six months on new country just outside Napier, Hawke's Bay, New Zealand, and assisted in the opening and development of an area of about 5,000 acres for a Napier firm. This country is hilly, and was covered with 'bush' (or heavy vine scrub, as we call it), and was felled and burnt off in the same manner as we do in Queensland. A mixture of grasses—principally English grasses—was then sown, and within six weeks of sowing we had ewes and lambs on it. The fencing was all barbed wire stapled to posts and strained very tight. The sheep run were Leicester sheep, and the rainfall about 40 in. Around our place there were a number of small farmers, on areas of from 50 to 100 acres of land, and all ran sheep and a few cows, and all were prosperous. I cannot see why our North Coast lands should not be equally suitable for either English or crossbred sheep, and coastal farmers would certainly have an immense advantage over inland farmers in both regular rainfall and accessibility to markets.

"In one direction, I think, further experimenting and inquiry would be advisable and interesting, in view of opening coastal areas and improving same for grazing purposes. As this is practically intense farming applied to grazing, a study of mixtures of grasses suitable to local conditions, in place of confining attention to one or two separate varieties, would be advisable; also cultivation of crops such as turnips for fattening. In New Zealand turnips are grazed in the field, the sheep themselves doing their own foraging. Large areas each year are cultivated for sheep alone. In any case, the subject is an interesting one, and so much attention has been drawn to 'Farmers' Sheep on the Coast'

that I am sure articles in your Journal bearing on fodder crops suitable for coastal lands—turnip, mangold wurzel, &c.—which could be obtained from New Zealand sources (North Island preferably), would be much appreciated by farmers who have an idea of engaging in this industry.

"One very attractive feature about lamb-raising is that it is a business that all members of a family can take an interest in. Children are especially good with lambs, and it is wonderful how fond they get of them and what useful and timely work they can do. Personally, although I am now engaged in cattle-raising, I have had many years of experience in sheep, on dry areas and on natural grasses, and I keep a little flock of about 100 running about the homestead. My children look after them almost entirely, and owing to the care they take of the ewes and young lambs they thrive well and the lambing is phenomenal.

"No matter how small a farm is, I am convinced a few sheep will pay, and pay handsomely, if it is only for home consumption of the mutton and a few to sell to neighbours, &c.; and with the small, cheap machines for shearing now obtainable, and which can be geared to any oil engine, the trouble of shearing presents no very great difficulty.

"To conclude, I am sure that any man running a little flock of suitable sheep (crossbreds for preference), using reasonable care, and in any difficulty seeking the advice of Mr. W. G. Brown, the sheep expert of the department, cannot help making a success of it, if he follows the sensible plan of a small flock first and build up as he gains experience."

## PAPER QUILLS FOR CUTWORMS.

### A DEADLY ENEMY FRUSTRATED.

An amateur gardener of the good old sort and a reader and subscriber of your interesting paper from its inception sends you the following "dodge" for the benefit of those who may not be aware of it. We all know how the *cutworm* (Dutch *misworm*) attacks and destroys plants put in by us in our garden, notwithstanding the liberal application of, for instance, vapourite and other remedies. In one night these pests have been known to eat off whole rows of such plants as tomatoes, cabbages, cauliflowers, &c.

Try the following simple and inexpensive remedy and "sure cure":—Before putting your plant in the ground wrap around the stem just above the roots some stout brown paper (or for that matter paper of any sort), say about 3 in. wide; then put in your plant with the paper round it covered about half-way in the ground. This will effectually prevent the worm from eating off the plant, as he can't eat through the paper, and we know he does his mischief *only just on the surface* and cannot climb. The paper has the additional advantage of holding up the plant after being put in the ground, and by the time the plant is strong enough the paper has rotted away.—"South African Gardening and Home Life."

# The Orchard.

## THE NAVEL ORANGE.

### CINCTURING.

By R. G. BARTLETT, Head Teacher, Buderim State School.

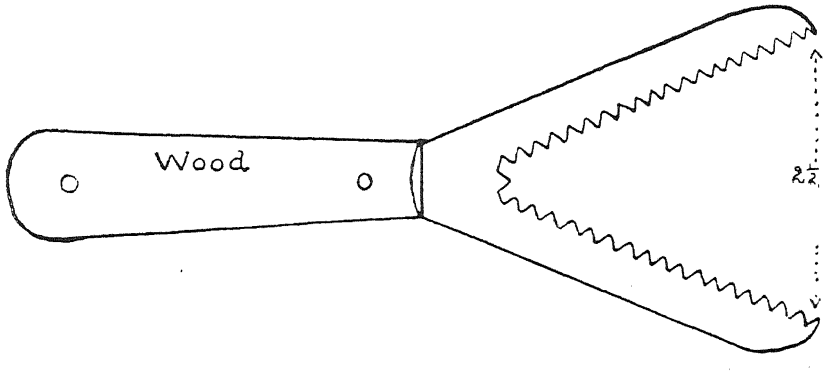
Quoting from Mr. Benson's book on "Citrus Culture"—"The tree is a strong and vigorous grower, with large dark-coloured leaves and a few small thorns. . . . The fruit is of a large size—in young trees over-large—having a fine, thin, smooth skin, which thickens considerably towards the stem end, and is usually of a pale-orange colour. The pulp is juicy, sweet, of fine flavour, contains very little rag, and is usually seedless. It is one of the first oranges to ripen, and has good keeping qualities, hence is a good shipper and valuable for export."

From this description the navel orange should be the ideal variety for a citrus man to grow; but, unfortunately, the experience of most growers is that, though the navel blooms profusely, it seldom sets a good crop of fruit—number as well as quality being required to make any variety a commercial success.

Numerous experiments have been and are still being carried out in order to assist nature in the setting of the fruit.

In irrigation areas, all that is needed is to flood the ground with water during the flowering season. But in Queensland irrigation is practically *non est*, and so something has to be found to take its place. One grower has tried removing a ring of bark from the trunk of the tree during the flowering, with splendid crops as a result. This, however, is too drastic for most orchardists, as they consider the life of the tree would inevitably be shortened by this practice. A more common and fairly successful method is to hammer a piece of No. 12 fencing-wire its own depth into the bark all round the trunk. This, however, tends to damage the young, soft wood, and cause unsightly excrescences.

After studying the methods and results of cincturing grape vines, the writer had a special tool made by the blacksmith as per the rough sketch.



The teeth of saws were set so that both cut at the one time, while the shape permits of the tool being used on any limb up to 2½ in. in diameter.

With the tool the bark of the limbs was cut through when the blossoms were well out. It has been found that in the case of deeply cut limbs, the crop set has been very heavy, while superficial cuts apparently did not cause any more fruit to set than was set on adjacent uncinctured trees. In one orchard, four out of six trees were cinctured, and the cuts tied round with raffia fibre to promote more rapid healing, but the result has been a failure, as not much difference can be seen between the crop on uncinctured trees and that of the cinctured trees, though the grower admits that beetles or bugs have been very busy eating the young fruit. However, in this one case only, failure has resulted, owing either to tying cuts with fibre or to the depredations of insects. Next year extended experiments should give more definite results.

Similar experiments in cincturing navel orange trees are being carried out on the Blackall Range—namely, at Montville and at Mapleton. A comparison of methods and results would greatly assist in perfecting the work and in removing cincturing beyond the experimental stage, thereby benefiting the citrus-growers of the State.

Buderim Mountain, 20th November, 1916.

## ARSENIC SPRAYING FOR THE BLACKBERRY PEST.

Mr. Allen M. Williams, of Te Aute Station, Pukehou, Hawke's Bay, New Zealand, describes, in the 'Journal of Agriculture' of New Zealand, 20th December, an effective and comparatively inexpensive weapon for the destruction of the blackberry pest. He says:—

"In reference to our treatment of blackberries, we first cleared the stock out of the paddock, and then sprayed the blackberries with 2 oz. arsenic to the gallon of water. When the bushes had quite dried off—say, in a month—we burned them. The man in charge of the work would then go to each bush twice a week to spray the young shoots as they appeared. In our soil (limestone subsoil), after the first week or two, it would only require looking at once a week, and gradually ease off until no more shoots appeared. The point is, not to let the young shoots get into leaf. The best time to spray is when the blackberries are in flower and the sap well up. If one is careful not to let the young shoots get into leaf, the stock can be put back into the paddock after the blackberries have been burnt, including any grass which may have been affected by the poison. We have always done this, and never lost a hoof. All our blackberries were absolutely destroyed in a very short time, but in lighter soils I can quite understand that it might take much longer. Do not cut the bushes down, but spray them as they stand."

## THE AVOCADO PEAR.

This fruit has nothing in common with the European pear. It merely resembles the pear of our orchards in shape. It is of the size of a large Jargonelle pear, has a tough coat, and contains a large, rugged seed. The fleshy part of the fruit is of a bright-yellow colour,

with a rich, delicate, creamy texture of about the consistency of firm butter, and with the fine flavour of a fresh walnut. In the West Indies, of which it is originally a native, it is called "subaltern's butter," and sometimes "vegetable marrow." The richness of the pulp necessitates the addition, when eating it, of something pungent, such as pepper and salt, wine, or limejuice and sugar; but the favourite condiment is pepper and salt. It is propagated from seed, but may be struck from cuttings of half-ripened wood without mutiliating the leaves. The tree attains the size of our apple-trees, and it grows well and fruits freely on our coast lands. It is being grown by Mr. Bliss, of "Glen Retreat," Enoggera; also at the Penal Establishment at St. Helena, and the Botanic Gardens, Rockhampton. A few seeds might be obtained from these sources. The Department of Agriculture has none for distribution. Rooted plants in pots can be obtained from S. Eaves, nurseryman, Adelaide street, Brisbane.

## THE CAROB TREE.

We are indebted to Mr. W. S. Campbell, Cooregab, Vaucluse road, Rose Bay, Sydney, for the following useful information concerning the Carob Tree:—

"When the Pera artesian bore, near Bourke, New South Wales, was taken over by the Agricultural Department of that State, I caused to be planted several small carob trees, as an experiment, to test their suitability for the climate when irrigated with artesian water. Three thrived admirably, and grew into most beautiful shady trees, one of which produced fine crops of pods. I saw these trees not long before I retired from the department, and they were then splendid specimens, and are probably still thriving. This little experiment shows clearly that the carob is well suited for the Western districts—500 miles from the coast, at any rate—and that the artesian water of the Pera bore suited them well. I may mention that the south Australian 'Sugar Gum' also thrived splendidly there, as well as the Olive, which produced really wonderful crops of excellent fruit, and the trees are absolutely free from the Black Olive Scale."

## THE MacGREGOR PINEAPPLE.

In February last year we gave a description of the MacGregor pineapple, grown at Campsie Fruit Farm by Mr. E. Smallman. This was accompanied by an illustration of the crop on a field planted in September, 1914, which the plants bore in 1916. This year the yield has been far greater than that of the first crop, as will be seen by the photograph taken in January last. The first crop averaged 10,000 pines per acre, and the average weight of the single fruit was 4½ lb. Mr. Smallman has already gathered several hundred cases for shipment South, and at the time of writing there were enough pines on the plants to fill a couple of hundred more cases. This goes to show that pineapples pay well if a good variety is grown and proper cultivation is given. The MacGregor pine brings the highest price in the Sydney market.

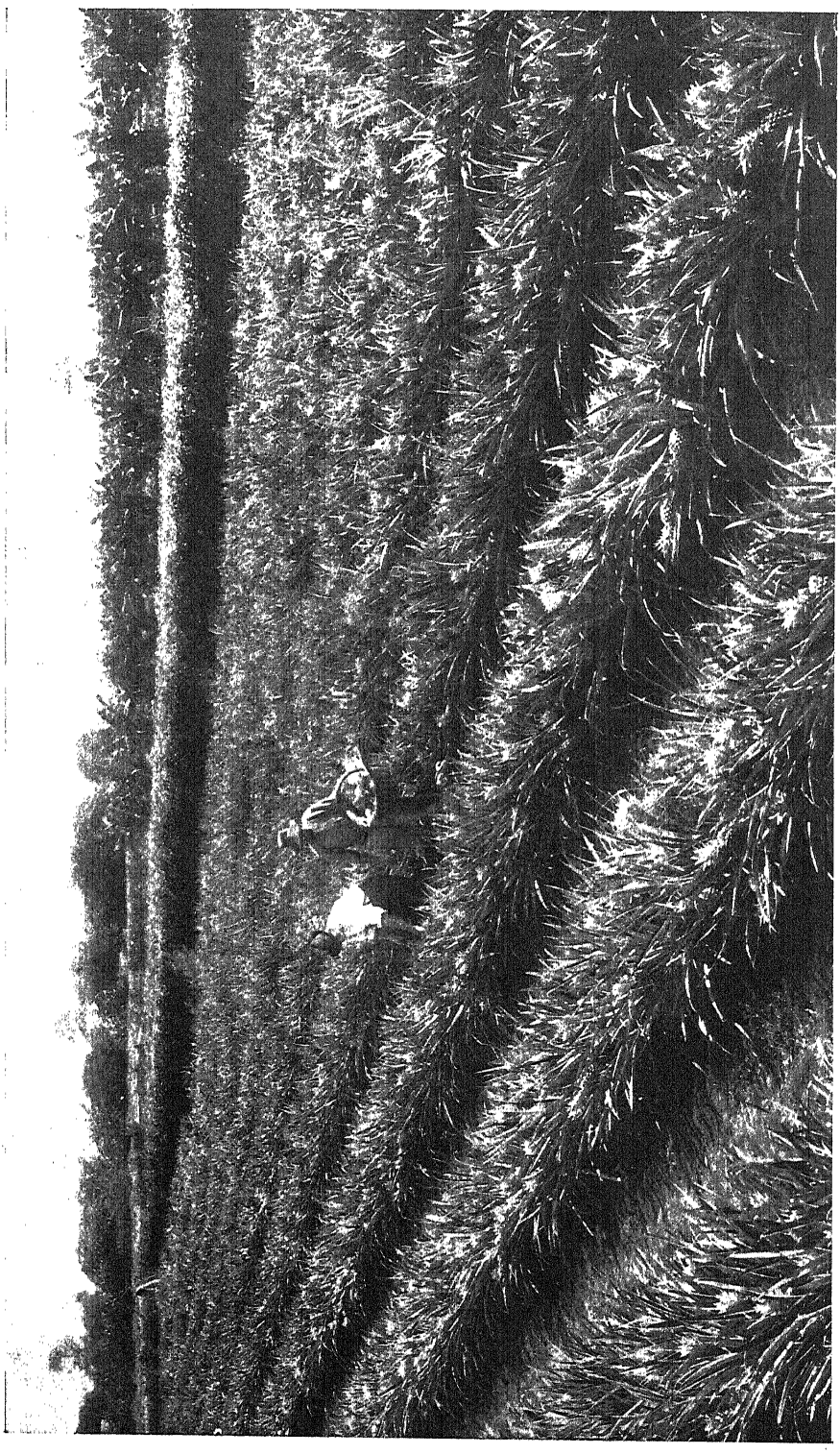


PLATE 5.—THE MACGREGOR PINEAPPLE CROP OF 1917 AT MR. E. SMALLMAN'S FARM, "CAMPSIE," ORMISTON.

# Viticulture.

## WINE INDUSTRY.

### THE CELLAR.

BY G. A. GATTINO.

A cellar, to be really good, must satisfy three conditions—

(1.) Has to be built so that the internal atmosphere marks the required temperature for maturing the wine.

(2.) Shall not be disturbed by winds or other causes affecting the quietness.

(3.) Must be kept sufficiently clean.

As I have previously stated, the tumultuous fermentation requires a temperature from 30 to 70 degrees F.; but the insensible fermentations (which complete the maturing of the wine) should have a temperature varying from 30 to 40 degrees F. A cellar should also be built in order to participate, in a progressive way, to the atmospherical changing of the seasons and shall not reciprocate the rough changes of them.

A cellar where the atmospherical disturbances could not be controlled is not adapted to improve and keep the wine. The latter at each rapid elevation of temperature would bring about precipitous fermentation, and at each sudden fall of same would cease to ferment before the correct time. These sudden changes of temperature, which damage the wine very much, are experienced in buildings situated above the ground level, and such cellars should be totally abolished, as well as all cellars too much under ground, as in the case of many old cellars of the old country, which were once built on this wrong idea. In this latter class of cellars, the atmosphere keeps a uniform temperature during all the year, therefore the wine, not being able to get the insensible fermentations required for improving and completing, cannot mature properly. The wine will become clear and drinkable, but, as it could not divest itself of the substances which precipitate only by the succession of insensible fermentations, when this wine is brought from the cellar it is liable to re-ferment and become cloudy and undrinkable.

A good cellar, therefore, should have the floor about 10 or 12 ft. under the ground level, and be provided with thick walls. The door of the cellar should open to the south, and, if possible, not leading direct to the open air. Several small windows with blinds are required, and should be highly situated. As a matter of fact, the sun must not penetrate into the cellar at all.

As the quietness of a cellar should not be disturbed, it is necessary that the latter be sheltered from the direct force of the winds and be

situated far from streets with continuous traffic. The wine, for refining and maturing well, requires a more or less long calmness, thus enabling it to slowly become free of all the small particles of dregs which precipate very slowly.

The French enologist, Vergnette Lamotte, was right in saying: "Les caves des grandes villes sont mauvaises" (the cellars of the big cities are bad).

The floor of the cellar must be well paved, not allowing the water to become stagnant. It is advisable that this floor have a slight descent to the centre of the building, falling towards a small cemented sub-well. Such small well would serve also the purpose of receiving any wine that would eventually spill from the casks if a breakage or leakage occurred in the absence of the cellarmen. To prevent the formation of humidity or mouldiness, the walls of the cellar should be plastered with hydraulic lime.

Besides the abovementioned conditions, the cellar must be kept thoroughly clean, not allowing the deposit of anything unconnected with the manufacture of the wine, especially things of a fermentable nature.

The cellar must be carefully and frequently washed, swept, and cleaned, preventing all formation of cobwebs, mouldiness, &c.

All these precautions have to be adopted by the winemaker who wishes to produce good wine. I will give the reasons why they are indispensable later on, when I write on the theories of the fermentations.

To complete the descriptions of the buildings required for making wine, I will only add a few words referring to the store or cellar for bottled wine. Generally the coolest part of the cellar is destined for the bottle department, but it would be better if a separate place could be built for this purpose. The bottled wine cellar, having to be used for the conservation of matured wine—whether in bottles, jars, or small casks—should be situated underground and have the floor at a lower level than the general cellar.

The wine to be placed in the bottle department has no need of further fermentation, but wants, instead, to be kept unalterable. This can be obtained by having the cellar for bottled wine very deep underground and with little light.

If any further description or plan of the abovementioned buildings are required, I am only too willing to give the necessary illustrations thereof.

# Tropical Industries.

## THE ACTION OF COPPER ARSENATE AND ARSENIOUS ACID ON SUGAR-CANE ROOTS.

The Bureau of Sugar Experiment Stations has received the following report from the Entomologist (Mr. E. Jarvis) :—

It is satisfactory to be able to state that experiments started at Gordonvale Laboratory last November, with the object of determining the action of copper arsenate and arsenious acid on growing roots of sugar-cane, have yielded results of a most encouraging nature, and are now far enough advanced to admit of publication of a few details regarding this research work.

In the first test, with arsenate of copper, short "sets" of "Badila" cane having three buds were planted in common 8-in. earthenware flower pots filled with coarsely sifted, red volcanic soil. Pots Nos. 1 to 4 were infected at the rate of 113 lb. of Paris Green per acre; the poison being mixed uniformly with the soil in pots Nos. 1 and 2, but buried in a horizontal layer a couple of inches below "sets" in Nos. 3 and 4.

No. 5 was treated at the rate of 226 lb. of the arsenical preparation per acre, thoroughly mixed with the soil; while Nos. 6 and 7 were untreated controls. These "sets," which were planted on 3rd October, sprouted together, all producing healthy-looking shoots. Six weeks later, when the resultant plants were photographed, the mean height of foliage in Nos. 1 and 2 was found to be 15 in; in Nos. 3 and 4, 18 in.; No. 5, 27 in.; and in Nos. 6 and 7, 15 in.

Nos. 1 to 5 had produced collectively eight shoots, and Nos. 6 and 7 five shoots; the average height of foliage for the five treated pots being 10 in., as against 7.50 in. for the two controls.

This seems to indicate that cane plants may perhaps derive benefit from absorption by their roots of minute quantities of copper salts; since it is a well-known fact that, in many cases, we are able to artificially stimulate plant growth by an application to the soil of weak solutions of copper sulphate. In the above experiment, all seven pots received the same measured quantity of water, sufficient to nicely moisten but be wholly absorbed by the earth, thus precluding drainage and possible loss of fine particles of the soil or arsenic. Artificial manure, consisting of a little nitrogen and potash, was given at intervals in the water, each pot receiving exactly the same amount.

The result conveyed by the foregoing figures merely confirms previous opinions with reference to Paris Green stated in last month's report.

The quantity per acre advocated in Bulletin No. 4 of this Bureau—in connection with cane grub control by means of poison baits—was only 8 lb., whereas it appears probable that at least 226 lb. per acre can, if desired, be administered to the soil in this way without causing injury to the cane.

Other experiments with Paris Green yielded results practically identical with that given above, so need not be referred to in detail. I may mention, however, that the cane growing in a number of 7-in. pots is higher at present in those treated with copper arsenate than in the controls, and finest of all in one containing cowpea leaves that had been dusted with the arsenical mixture at the rate of 113 lb. per acre.

This experiment was started on the 1st November, and five weeks later (5th December) foliage in these ten pots averaged about 18 in. in height.

As regards the action of commercial white arsenic, cane "sets" were planted, on 4th October, in half a dozen 10-in. flower pots, and when photographed, after a lapse of six weeks, the average height of cane leaves in those containing soil infected at rates of from 100 to 200 lb. of arsenious acid to the acre was found to be 27.80 in., while in a single pot, used as a control, the height was 26 in. All plants appeared equally healthy throughout the course of this experiment. Outdoor tests were limited to an application of copper arsenate to the roots of two months old plant cane growing near the laboratory, the poison being simply dusted over damp cowpea leaves, which were then buried about 6 in. deep on each side of the stools and 8 in. from the centre of the row. Plants treated in this way continued healthy, and developed in a normal manner. Five weeks later, when the soil was examined, the treated cowpea foliage was easily located owing to its conspicuous green hue, but had, of course, partially decayed. The rainfall experienced during the course of the above test was only 112 points, all of which fell on the 7th instant, about a week after burial of the poisoned leaves.

The primary emergence of our grey-back cockchafer was noted by Mr. J. Clarke, of Highleigh, on the 7th instant, and at Meringa a week later. Several experiments were initiated this month in order to determine approximately the duration of the egg stage of albohirta under both normal and adverse climatic conditions.

On the 27th a collection of these beetles was procured from the former locality (Highleigh), and twenty female specimens confined separately in cages of damp soil.

When examined after an interval of four days (twenty-three days after emergence), fourteen out of the twenty beetles had, between them,

laid 318 eggs, and the remaining six were constructing earthen chambers in which to oviposit.

Half a dozen females derived from the abovementioned collection, but placed on the same date in cages containing dry soil, did not lay; and ultimately, upon dying, four of them were found by dissection to contain eighty-four full-sized eggs fit for exclusion, and varying in individuals from ten to thirty in number. The ovaries of the other two were small and apparently unfertile.

We may, I think, reasonably assume from the foregoing evidence that the simultaneous desire to oviposit manifested by the former batch of twenty beetles was induced by the ideal conditions of soil-moisture artificially provided for them; and, moreover, that the ovary in these insects had in most cases attained full development prior to the date of capture, but oviposition had been purposely postponed owing to abnormal dryness of the soil.

It is hoped to deal more fully with this matter in a later report, but I may state that, apart from any scientific interest it may possess, these investigations have, up to the present, resulted in discoveries of more or less economic value in connection with the control of the egg stage of *Lepidiota albohirta*.

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## PEARLS IN COCOANUTS.

In 1911, the then Governor of Queensland (Sir William MacGregor) obtained from Mr. T. A. Williams, of Sabai Island, Torres Strait, valuable information on the subject of the diameter of space to which root cords spread out from the base of cocoanut trees, and courteously handed the report to us for publication. This appeared in the October issue of the Journal, 1911.

Whilst discussing the root question, His Excellency informed us that in Hawaii (or Fiji?) he had been handed a cocoanut for his refreshment, and that he found inside it a valuable pearl. He saw the cocoanut opened, and was quite sure the pearl was not dropped into it. He gave the pearl to a lady present, who afterwards wore it at some Court function in London. Singularly enough, to-day we find in a book on "Tropical Agriculture," by H. A. Alford Nicholls, M.D., F.L.S., C., M.Z.S., &c., the following remarkable confirmation of the existence of pearls in cocoanuts. The author says, when describing the various parts of the nut: "Finally, a very singular and highly-prized pearl is found, under very rare circumstances, in cocoanuts, and a specimen has lately been added to the Museum of the Royal Gardens at Kew (1892)."

# Forestry.

## FORESTRY IN HAWAII.

The Forestry Department in Hawaii announces that the Division of Forestry would have ready for distribution, about December last, several thousand young trees of the Australian red cedar, *Cedrela australia*, which it desires to have planted out in as many different situations as possible in order to test its adaptability to the Hawaiian Islands. In connection with this, the "Hawaiian Forester and Agriculturist," of October, 1916, writes:—

"This is a timber tree which promises to be of great value to the Territory. Its distribution has been made possible by the gift of a quantity of seed which Mr. A. W. van Valkenburg and Mr. C. E. Smith kindly turned over to this Division and which Mr. Smith personally selected and gathered recently in Australia.

"The timber of the Australian red cedar is considered the most valuable produced in New South Wales, and it is in universal use there. The tree is found growing naturally in Queensland and New South Wales, especially in the warmest and moistest districts between the latitudes of 35 degrees and 20 degrees south. It grows best in protected places where there is a little shade. The tree is easily transplanted, is a rapid grower, and in Australia attains a height up to 200 ft., with a diameter up to 10 ft. The size of the average tree now being cut in Australia is about half of the above.

"The wood of the Australian red cedar is equal to mahogany but lighter in weight. It is used for many of the same purposes—for tables, cabinets, furniture, doors, and interior finish, and it is excellent for carriage-building, because it is light and easily worked. It seasons well with very little splitting, and is very durable when kept dry.

"The Division of Forestry will be glad to place a number of these trees in the hands of tree planters who will be willing to set them out in suitable situations, care for them, and report on their growth in after years. Orders for these trees will be gladly received from those who are willing to do this and who have not already received special notification that these trees will be available for distribution."

## SOME USES OF HONEY.

*Honey for Cleansing the Hands.*—Honey is an excellent cleanser of the skin, though few are aware of the fact. Try this: Rub a little honey on the dry skin; moisten a little, and rub again; use more water, and rub. Wash thoroughly, when it will be found that the hands are as clean as the most powerful soap can make them.

*Honey for Freckles.*—Half a pound of honey, 2 oz. glycerine, 2 oz. alcohol, 6 drams citric acid, 15 drops ambergris. Apply night and morning.

# Entomology.

## THE CANE BEETLE.

The General Superintendent of Sugar Experiment Stations has received the following report from Mr. Edmund Jarvis, Entomologist to the Bureau: —

With further reference to experimentation relating to the egg stage of our principal cane-beetle—alluded to in last month's report—it will be of interest to record the following data just obtained at Gordonvale Laboratory.

Dealing firstly with the method of oviposition as practised by the grey-back beetle (*Lepidiota albohirta*, Water.), I may state that the depth at which its eggs are deposited depends naturally to a great extent upon the amount of moisture contained in the soil at the time, which, however, needs to be sufficient to keep the ova thoroughly damp during a period of at least two weeks.

Under normal weather conditions this species most likely oviposits in the field at a depth of about 6 in.

Practically all of the seventy-three female specimens confined in moist soil at the laboratory this month oviposited at the bottom of their cages, where the earth had been made wetter and firmer than elsewhere. Those laying large batches of eggs usually constructed a chamber of irregular shape, about an inch in diameter, the sides of which were firmly compacted—in order, no doubt, to prevent the interior from becoming filled with soil, that if coming into close contact with the comparatively soft ova would interfere with their proper expansion. This cavity, however, generally contained a good deal of loose earth, introduced most likely owing to disturbance of the outer soil by the insect as it crawled from the spot after having laid its eggs.

These are placed in a flattened mass on the floor of the chamber, and may be deposited either separately or attached to each other in short strings of two or more, or connected groups consisting of as many as seventeen (so far as observed), but are usually laid singly and nearly always intermixed with small particles of soil.

At the time of deposition, the egg is about 4.25 mm. long—twelve this size placed end to end in a straight line measuring exactly 2 in.—but during development gradually swells, until just prior to hatching it is fully a quarter of an inch in length (6.30 mm.).

Being of a creamy-white colour, these large oval-shaped eggs are necessarily conspicuous when occurring in dark soils.

With regard to the number that may be produced by a single specimen of albohirta, it is interesting to be able to state that results just obtained verify the correctness of previous opinions in this connection recorded last January ("Australian Sugar Journal," Vol. VII., p. 902).

Judging by numerous dissections made at that time, I concluded, from the structure of the ovarian tubes, that an individual beetle, although often laying from twenty-four to thirty eggs, was capable of

producing as many as three dozen—a number, by the way, much in excess of that given by other entomologists, who have stated the maximum to be twenty-four or twenty-five.

During the present season, however, a female of this species caged at the laboratory actually deposited, on the 8th instant, a batch of thirty-six eggs, and from the ovary of another specimen a similar number was taken, fully grown, and almost fit for exclusion. In addition to the above high record it may be mentioned that two beetles laid thirty-four eggs each; while other lots—obtained from chambers formed in cages of damp earth—comprised eight batches of thirty eggs; three of twenty-nine; one of twenty-eight; one of twenty-seven; seven of twenty-six; three of twenty-five; and eight of twenty-four.

The seventy-three females used in the above experiments produced altogether 1,537 eggs (21·5 per insect), and as all specimens laying less than fifteen were examined after death and the ovaries found empty, we may assume this average to be fairly correct. When laying twenty or less, the individual eggs in such lots are generally a little larger at the time of deposition than those taken from chambers containing twenty-five to thirty-six. Among batches of thirty to thirty-six, it is not unusual to find two or three much smaller than the rest.

Regarding the duration of the period preceding oviposition, recent experiments incline me to believe that *Lepidiota albohirta* deposits only one large batch, which—in the event of emergence being followed by continuous dry weather—most likely includes every egg it is able to lay. On the other hand, should this interval prove more or less showery, oviposition may, and no doubt frequently does, take place as soon as each of the twelve ovarian tubes forming the ovary contain two fully grown eggs. Under the latter climatic conditions, maternal instincts would naturally prompt the female to take advantage of the presence of abundant moisture in the soil; thus we may reasonably assume that the batch of twenty-four so often met with, consisting of eggs that usually mature simultaneously, would, under such circumstances, be laid first; while the remaining supplementary twelve, which apparently constitute a sort of reserve supply and do not attain full development until some days later, would be deposited at random either singly or in small numbers as opportunity might offer. For example: The seventy-three beetles abovementioned chanced to experience a dry spell after emerging from the ground, and, egg-laying being delayed in consequence, deposited the whole contents of the ovary in one large batch; while in no instance did a specimen subsequently yield additional ova, although living for several days longer subjected to the same congenial environment.

With reference to the influence of parasites in this connection, it was noticed that a grey-back beetle, harbouring a single maggot of one of the smaller parasitic flies, managed, notwithstanding, to mature and deposit fourteen eggs about twenty days after emergence, and did not succumb until six days later.

Another containing a large dexiid grub and a third specimen infested with nine dipterous maggots lived for nearly three weeks, but were unable to oviposit.

## THE MAGGOT-FLY.

BY W. G. BROWN, Instructor in Sheep and Wool.

On a recent trip to the South I found pastoralists, and even the authorities on the above matter, in despair as to finding a method of destroying maggots or preventing the infestation of sheep by the fly. It is the same thing here in Queensland. It has seemed to me for years that the problem has been tackled at the wrong end. It seems obvious that if the fly can be destroyed then no palliatives will be required; yet it is safe to say that nine hundred and ninety-nine people in a thousand who are interested in the matter, and who have fly-stricken sheep, are looking for something which will either destroy the maggots or minimise their effects.

Until this year, in the very great majority of cases, it was known that the fly did not blow sheep with less than two months' wool. In the middle of November last year, on the Downs, I saw newly shorn sheep blown on the neck, in the ears, and in wrinkles; in fact, all over the body. At the same time, on walking through the paddocks, it was to be seen that almost every blade of grass and the stems of the various shrubs or weeds were literally swarming with flies, many of which were the red-headed blue fly or the common green fly, both of which are reputed as being addicted to striking the sheep.

What chance has any sheep of escaping if the paddocks be full of flies? The cost of palliatives by this time (from 1902) must have run into hundreds of thousands of pounds, and the losses of sheep and wool quite incalculable. Therefore, if we are to do anything to lessen the losses, it seems that the fly itself must be tackled; and, while that is being done, we can use the palliatives, such as they are, in the hope that something may be discovered which will deal with the fly in a wholesale manner.

Here is a suggestion which comes from a well-known pastoralist, and it seems so reasonable that I thought it well to put it on paper. We have the prickly-pear pest, and many methods have been used to kill it wholesale. Amongst the methods is the use of a gas heavier than air, and which is poisonous. This seems to kill pear wherever I have seen it tried.

Our soldiers at the front, too, are liable to be killed with a gas heavier than air. Now, if pear or human beings can be killed by such a gas in a wholesale manner, it seems quite reasonable that all these flies may be killed also, and our chemists should be able to find such a gas.

To apply it, the animals could be removed from a paddock, placed in high country, or at the back of the gas-holders, and then a stream of poisonous fumes allowed to flow over the country.

Even if the sheep should have to be removed from the district for a time, it is no more than happens if water or feed fail in bad seasons. Details, of course, would have to be left to the chemists; but surely if human beings and prickly-pear can be destroyed in such a manner, flies are not immune.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH DECEMBER, 1916, TO 26TH JANUARY, 1917.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Violette's Peer's Girl | Jersey ... ... | 13 Dec., 1916 | 629 | 6·4 | 47·73 | |
| Iron Plate ... | ,, ... ... | 9 Dec. ,, | 737 | 4·6 | 39·94 | |
| Miss Edition | ,, ... ... | 25 Dec. ,, | 777 | 4·1 | 37·42 | |
| Sweet Meadows | ,, ... ... | 18 Aug. ,, | 490 | 6·0 | 34·82 | |
| Nina ... | Shorthorn... ... | 23 June ,, | 729 | 3·9 | 33·36 | |
| Jeannie ... | Ayrshire ... ... | 27 Oct. ,, | 651 | 4·3 | 32·94 | |
| Comedienne | Jersey ... ... | 24 Nov. ,, | 557 | 5·0 | 32·88 | |
| Miss Bell ... | ,, ... ... | 1 Aug. ,, | 496 | 5 3 | 32·06 | |
| Lady Margaret | Ayrshire ... ... | 8 Jan., 1917 | 580 | 4·5 | 30·74 | |
| Queen Kate | ,, ... ... | 15 June, 1916 | 683 | 3·8 | 30·42 | |
| Twylish's Maid | Jersey ... ... | 2 Nov. ,, | 536 | 4·8 | 30·34 | |
| Bluebelle ... | ,, ... ... | 22 June ,, | 580 | 4·4 | 30 04 | |
| Lady Dorset | Ayrshire ... ... | 14 Sept. ,, | 668 | 3·8 | 29·75 | |
| Lilia ... | ,, ... ... | 4 Sept. ,, | 543 | 4·4 | 28·11 | |
| Princess Kate | ,, ... ... | 20 June ,, | 508 | 4·6 | 27·53 | |
| Charity ... | Jersey ... ... | 28 May ,, | 393 | 5·8 | 26·98 | |
| Constancy ... | Ayrshire ... ... | 27 Dec. ,, | 673 | 3·4 | 26·73 | |
| Lady Annette | ,, ... ... | 11 Nov. ,, | 708 | 3·2 | 26·42 | |
| Rosine ... | ,, ... ... | 6 July ,, | 570 | 3·9 | 26·09 | |
| La Hurette Hope | Jersey ... ... | 6 Oct. ,, | 498 | 4·3 | 25·19 | |
| Thornton's Fairetta | ,, ... ... | 26 May ,, | 498 | 4·0 | 23·38 | |
| Skylark ... | Ayrshire ... ... | 21 March ,, | 440 | 4·4 | 22·79 | |
| Netherton Belle | ,, ... ... | 11 March ,, | 372 | 4·9 | 21·49 | |
| Lady Loch II. | ,, ... ... | 17 March ,, | 391 | 4·6 | 21·18 | |
| Glen ... | Shorthorn... ... | 8 Jan., 1917 | 415 | 4·2 | 20·48 | |

The above cows were fed on natural pasture only.

## BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following list of breeders in Queensland of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in this State. The Department of Agriculture and Stock undertakes no responsibility in relation to the entries in the list; but, when making inquiries, the condition was imposed that the entries were to be comprised only of the stock that had been entered in a herd book or are eligible for entry.

The list as now published is incomplete; it includes the information received to date, and will be added to from time to time. Any owner desiring to have his stock included, should notify the Under Secretary of the breed of purebred stock he owns, the number of males and females entered or eligible for entry in a herd book, and the herd book in which they are entered.

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| **AYRSHIRES.** | | | | |
| Queensland Agricultural College | Gatton .. .. | 14 | 45 | Ayrshire Herd Book of Queensland |
| State Farm .. .. | Warren, Rockhampton | 9 | 88 | ditto |
| H. M. Hart .. .. | Glen Heath, Yalangur | 6 | 15 | ditto |
| L. H. Paten .. .. | Jeyandel, Calvert .. | 8 | 20 | ditto |
| J. H. Paten .. .. | Yandina .. .. | 8 | 23 | ditto |
| J. H. Fairfax .. .. | Marinya, Caniooya | 9 | 55 | ditto |
| State Farm .. .. | Kairi .. .. .. | 4 | 8 | ditto |
| F. A. Stimpson .. | Ayrshire Stud Farm, Fairfield, South Brisbane | 17 | 68 | ditto |
| J. W. Paten .. .. | Wanora, Ipswich .. | 10 | 42 | ditto (Includes 29 cows in advanced register.) |
| **JERSEYS.** | | | | |
| W. Siemon & Sons Ld. | Roma st., Brisbane .. | 6 | 60 | Queensland Jersey Herd Book |
| Queensland Agricultural College | Gatton .. .. | 13 | 30 | ditto |
| W. J. Barnes .. .. | Cedar Grove .. | 10 | 27 | ditto |
| W. J. Affleck .. .. | Grasmere, N. Pine .. | 6 | 31 | ditto |
| M. W. Doyle .. .. | Moggill .. .. | 4 | 12 | ditto |
| State Farm .. .. | Kairi .. .. .. | 6 | 40 | ditto |
| James T. Turner .. | The Holmwood, Neurum | 1 | 5 | ditto |
| Robert Conochie .. | Brookland Jersey Stud Farm, Brooklands, Tingoora | 9 | 21 | ditto |
| G. A. Buss .. .. | Bundaberg .. .. | 5 | 14 | ditto |
| T. V. Nicholson .. | Windsor .. .. | 2 | 8 | ditto |
| Geo. H. Crowther .. | Montrose, Oakey .. | 7 | 43 | ditto |
| E. F. Fitzgibbon .. | Listowel, Oakey .. | 7 | 30 | ditto |
| **GUERNSEYS.** | | | | |
| Queensland Agricultural College | Gatton .. .. | 2 | 2 | Eligible but no Herd Book in Queensland |
| **HOLSTEINS.** | | | | |
| Queensland Agricultural College | Gatton .. .. | 3 | 10 | Holstein-Friesian Herd Book of Australia |
| George Newman .. | Wyreema .. .. | 9 | 37 | ditto |
| F. C. G. Gratton .. | Towlerton, Kingsthorpe | 2 | 11 | Eligible for entry in Holstein-Friesian Herd Book of Australia |
| State Farm .. .. | Kairi .. .. .. | 1 | 2 | ditto |
| R. S. Alexander .. | Glenlomond Farm, Columboola | 3 | 1 | Holstein Friesian Herd Book of Australia |
| S. H. Hosking .. | Racing Plains, Toogoolawah | 2 | 23 | ditto |
| C. Behrendorff .. | Inavale Stud Farm, Bunjurgen, *via* Boonah | 5 | 10 | ditto |

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| **ILLAWARRA.** | | | | |
| John Hardcastle .. | Dugandan .. .. | 5 | 17 | Illawarra Herd Book of Queensland |
| Hunt Bros. .. .. | Maleny .. .. | 3 | 62 | ditto |
| W. F. Savage .. | Ramsay .. .. | 2 | 29 | ditto |
| G. E. J. Chaseling .. | Brundah, Coolabunia | 1 | 45 | ditto |
| P. Biddles .. .. | Home Park, Netherby | 3 | 14 | ditto |
| A. N Webster .. | Yaralla, Maleny .. | 5 | 65 | ditto |
| A. Pickels .. .. | Blacklands, Wondai | 4 | 82 | ditto |
| **MILKING SHORTHORNS.** | | | | |
| A. Rodgers .. .. | Torrans Vale, Lanefield | 3 | 18 | Milking Shorthorn Herd Book of Queensland |
| Wm. Rudd .. .. | Airedale, Christmas Creek, Beaudesert | 6 | 30 | ditto |
| W. Middleton .. .. | Devon Court, Crow's Nest | 3 | 27 | ditto |
| P. Young .. .. | Talgai West, Ellinthorp | 11 | 60 | ditto |
| **BEEF SHORTHORNS.** | | | | |
| T. B. Murray-Prior .. | Maroon, Boonah .. | .. | 17 | Queensland Shorthorn Herd Book |
| T. B. Murray-Prior .. | Maroon, Boonah .. | 2 | 20 | Australian Herd Book |
| **HEREFORD.** | | | | |
| H. F. Elwyn .. .. | Gunyan, Inglewood | 250 | 750 | Australian Hereford Herd Book |
| Mrs. Lumley Hill .. | Bellevue .. .. | 45 | 127 | Entered or eligible for entry A.H.H.B. |
| James T. Turner .. | The Holmwood, Neurum | 25 | 50 | Australian Hereford Herd Book |
| A. J. McConnel .. | Dugandan, Boonah | 43 | 60 | ditto |
| **ABERDEEN ANGUS.** | | | | |
| G. C. Clark .. .. | East Talgai, Ellinthorp | 4 | 10 | Entered or eligible for N.Z.H.B. |
| **SHORTHORN.** | | | | |
| C. E. McDougall .. | Lyndhurst, Warwick | 25 | 50 | Entered or eligible Q.H.B. |
| W. B. Slade .. .. | East Glengallan, Warwick | 77 | 283 | Queensland Shorthorn Herd Book |
| W. T. Scrymgeour .. | "Tara," Arthur st., Toowoomba | 79 | 300 | ditto |
| **SUSSEX.** | | | | |
| James T. Turner .. | The Holmwood, Neurum | 2 | 4 | Sussex Herd Book |

## PEPSIN V. RENNET.

The following particulars concerning the investigation in connection with the manufacture of pepsin for cheesemaking in view of the shortage of rennet, the export of which has been prohibited by war regulations in Europe, have been supplied by the hon. secretary of the Queensland Committee of the Commonwealth Advisory Council of Science and Industry, and they go to show that the results of the use of pepsin are more than equal to those obtained by rennet. It appears that pepsin costing 1¾d. will go as far as rennet costing, to-day, 1s.:—

"The average annual production of cheese in the Commonwealth from 1910 to 1915 was 18,097,424 lb. Assuming 1 lb. of pepsin is required for 9,000 lb. of cheese, 2,019 lb. of pepsin would be required to supply the whole Commonwealth if pepsin entirely displaced rennet in cheesemaking. The normal price of pepsin is usually £1 1s. per lb. This would mean that the maximum value of the industry would be worth, say, £2,200. It seems probable that at least another ton of pepsin would be utilised for the manufacture of peptonised foods, &c.

"There is no doubt that pepsin can be made here, and that it would have been produced locally if sufficient inducement were forthcoming. Mr. F. E. Trollope, formerly chemist to the Bovril Company, London, and to Angliss and Co., Melbourne, states that he has extracted high-grade pepsin from stomachs of both hogs and sheep, and that there are no technical difficulties in the extraction. According to Mr. Trollope, 1 ton of sheep's stomachs will give 2 per cent., or 45 lb., of pepsin; consequently, approximately, 50 tons of stomachs would be required to produce 1 ton of pepsin. The pepsin is at least twenty times as strong as rennet extract, and 5 grams of pepsin will coagulate as much milk as 3½ to 4 oz. of rennet extract. If rennet in normal times is worth 10s. per gallon, pepsin is worth £1 per lb. Rennet recently was sold at £4 15s. per gallon, and is unobtainable even at that price.

"The sheep's stomachs utilised for making the pepsin are at present made into fertiliser, and for that purpose are worth about £4 per ton. As 50 tons would be required for the manufacture of 1 ton of pepsin, the raw material for a year's supply of pepsin would be worth £200. The material could still be utilised for fertiliser purposes after the rennet is extracted, so that the actual cost of raw material would be at the outside £40. The labour required would be an experienced chemist and an assistant registered as boiler attendant. The plant (irrespective of building) would be a boiler for steam and connections, vacuum pan and pump, wooden vats, drying oven, dialysers, laboratory apparatus for testing and standardising pepsin, and a grinding mill, making a total cost of about £750."

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, DECEMBER 28, 1916, TO JANUARY 27, 1917.

Eight thousand nine hundred and ninety-four eggs were laid during the month, an average of 123·2 per pen. The heat wave from the 10th to the 12th, inclusive, was one of the worst we have experienced here. The temperature (106 degrees) was not so high as we have had it on previous occasions, but the accompanying humid atmosphere made it very oppressive. Every attention was given to throwing about water in the houses, with the result that we lost one bird only, a Black Orpington owned by Mr. Fanning. The laying, however, was considerably checked; many birds have stopped altogether and are going into moult. Geo. Tomlinson wins the monthly prize with 154 eggs. The following are the individual records:—

| Competitors. | Breed. | Dec. | Total. |
|---|---|---|---|
| *J. Zahl | White Leghorns | 118 | 1,301 |
| *Miss M. Hinze | Do. | 124 | 1,282 |
| *T. Fanning | Do. | 115 | 1,277 |
| *A. T. Coomber | Do. | 128 | 1,270 |
| *J. M. Manson | Do. | 124 | 1,266 |
| W. Meneely | Do. | 143 | 1,260 |
| G. H. Turner | Do. | 126 | 1,250 |
| Geo. Tomlinson | Do. | 154 | 1,247 |
| J. R. Wilson | Do. | 134 | 1,245 |
| A. Howe, N.S.W. | Do. | 105 | 1,214 |
| Dr. E. C. Jennings | Do. | 124 | 1,204 |
| *E. A. Smith | Do. | 139 | 1,199 |
| *A. E. Walters | Do. | 138 | 1,194 |
| *E. F. Dennis | Do. | 132 | 1,187 |
| J. M. Manson | Black Orpingtons | 116 | 1,175 |
| Mrs. Munro | White Leghorns | 136 | 1,174 |
| Mrs. W. D. Bradburne, N.S.W. | Do. | 132 | 1,166 |
| *Dixie Egg Plant | Do. | 123 | 1,160 |
| A. W. Bailey | Do. | 136 | 1,158 |
| Geo. Prince | Do. | 128 | 1,151 |
| *J. H. Gill, Victoria | Do. | 140 | 1,147 |
| T. Taylor | Do. | 127 | 1,146 |
| W. Lyell | Do. | 133 | 1,145 |
| H. W. Broad | Do. | 134 | 1,138 |
| *W. H. Knowles | Do. | 137 | 1,135 |
| Kelvin Poultry Farm | Do. | 116 | 1,130 |
| A. H. Padman, S.A. | Do. | 152 | 1,130 |
| T. E. Jarman, N.S.W. | Do. | 127 | 1,129 |
| E. Pocock | Do. | 143 | 1,128 |
| *J. F. Dalrymple, N.S.W. | Rhode Island Reds | 124 | 1,128 |
| *Mrs. J. H. Jobling, N.S.W. | Black Orpingtons | 87 | 1,127 |
| T. B. Hawkins | White Leghorns | 112 | 1,121 |
| F. Clayton, N.S.W. | Do. | 139 | 1,118 |
| W. Purvis, S.A. | Do. | 128 | 1,114 |
| P. Brodie | Do. | 128 | 1,113 |
| Cowan Bros., N.S.W. | Do. | 145 | 1,108 |
| Mars Poultry Farm | Do. | 135 | 1,104 |
| *C. Knoblauch | Do. | 126 | 1,104 |
| A. F. Camkin, N.S.W. | Do. | 137 | 1,100 |
| R. Burns | S. L. Wyandottes | 124 | 1,098 |
| J. Anderson, Victoria | White Leghorns | 138 | 1,094 |
| *E. West | Do. | 116 | 1,090 |

## EGG-LAYING COMPETITION—*continued.*

| Competitors. | Breed. | Dec. | Total. |
|---|---|---|---|
| E. F. Dennis ... ... ... ... | Black Orpingtons ... | 134 | 1,088 |
| H. Jobling, N.S.W. ... ... ... | Do. ... ... | 115 | 1,081 |
| T. Fanning ... ... ... ... | Do. ... ... | 130 | 1,080 |
| King and Watson, N.S.W. ... ... | White Leghorns ... | 130 | 1,076 |
| Mrs. C. Davis ... ... ... ... | Do. ... ... | 113 | 1,075 |
| Cowan Bros., N.S.W. ... ... ... | Black Orpingtons ... | 117 | 1,068 |
| W. Becker... ... ... ... ... | White Leghorns ... | 135 | 1,061 |
| G. W. Holland ... ... ... ... | Do. ... ... | 150 | 1,058 |
| A. Hirst, N.S.W. ... ... ... | Do. ... ... | 126 | 1,047 |
| *W. L. Forrest, N.S.W.... ... ... | White Leghorns ... | 106 | 1,044 |
| *Kelvin Poultry Farm ... ... ... | Do. ... ... | 90 | 1,043 |
| J. G. Richter ... ... ... ... | Do. ... ... | 121 | 1,031 |
| Mars Poultry Farm ... ... ... | Black Orpingtons ... | 128 | 1,026 |
| C. P. Buchanan ... ... ... ... | White Leghorns ... | 105 | 1,023 |
| S. B. Tutin ... ... ... ... | Do. ... ... | 92 | 1,009 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 109 | 1,002 |
| R. Burns ... ... ... ... ... | Black Orpingtons .. | 119 | 996 |
| *J. H. Madrers, N.S.W. ... ... | Rhode Island Reds ... | 100 | 983 |
| *J. W. Macrae ... ... ... ... | Black Orpingtons ... | 100 | 977 |
| Moritz Bros., S.A. ... ... ... | White Leghorns ... | 131 | 968 |
| H. Hammill, N.S.W. ... ... ... | Do. ... ... | 143 | 967 |
| Harveston Poultry Farm ... ... | Do. ... ... | 129 | 960 |
| J. Gosley ... ... ... ... ... | Do. ... ... | 97 | 951 |
| F. W. Leney ... ... ... ... | Do. ... ... | 118 | 937 |
| W. Lindus, N.S.W. ... ... ... | Do. ... ... | 124 | 936 |
| *J. Anderson, Victoria ... ... ... | Red Sussex ... ... | 80 | 924 |
| L. K. Pettit, N.S.W. ... ... ... | White Leghorns ... | 113 | 906 |
| W. H. Forsyth, N.S.W. .. ... | Black Orpingtons ... | 84 | 879 |
| A. T. Coomber ... ... ... ... | Sicilian Buttercups ... | 107 | 861 |
| F. W Leney ... ... ... ... | Rhode Island Reds ... | 110 | 829 |
| E. F. Dennis ... ... ... ... | White Wyandottes ... | 115 | 770 |
| Totals ... ... ... ... | ... | 8,994 | 79,683 |

* Indicates that pen is taking part in single hen test.

## RESULTS OF SINGLE HEN TEST.

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| J. Zahl ... ... ... ... | 211 | 227 | 216 | 216 | 222 | 209 | 1,301 |
| Miss M. Hinze ... ... ... | 220 | 195 | 241 | 196 | 223 | 207 | 1,282 |
| T. Fanning ... ... ... | 227 | 225 | 226 | 219 | 195 | 185 | 1,277 |
| A. T. Coomber ... ... ... | 218 | 226 | 221 | 189 | 192 | 224 | 1,270 |
| J. M. Manson ... ... ... | 192 | 244 | 201 | 204 | 228 | 197 | 1,266 |
| E. A. Smith ... ... ... | 222 | 217 | 195 | 222 | 171 | 172 | 1,199 |
| A. E. Walters ... ... ... | 207 | 232 | 194 | 180 | 208 | 173 | 1,194 |
| E. F. Dennis ... ... ... | 186 | 221 | 170 | 227 | 202 | 181 | 1,187 |
| Dixie Egg Plant ... ... ... | 246 | 229 | 237 | 225 | ... | 223 | 1,160 |
| J. H. Gill ... ... ... ... | 168 | 195 | 189 | 222 | 190 | 183 | 1,147 |
| W. H. Knowles, junr. ... ... | 179 | 181 | 195 | 168 | 213 | 199 | 1,135 |
| J. F. Dalrymple ... ... ... | 178 | 187 | 202 | 156 | 220 | 185 | 1,128 |
| Mrs. J. H. Jobling ... ... | 179 | 239 | 171 | 182 | 169 | 187 | 1,127 |
| C. Knoblauch ... ... ... | 166 | 199 | 180 | 172 | 192 | 195 | 1,104 |
| E. West ... ... ... ... | 220 | 199 | 166 | 170 | 152 | 183 | 1,090 |
| W. L. Forrest ... ... ... | 209 | 208 | 52 | 173 | 210 | 192 | 1,044 |
| Kelvin Poultry Farm ... ... | 169 | 167 | 159 | 161 | 221 | 166 | 1,043 |
| J. H. Madrers ... ... ... | 128 | 193 | 192 | 185 | 145 | 140 | 983 |
| J. W. Macrae ... ... ... | 136 | 202 | 178 | 177 | 138 | 146 | 977 |
| J. Anderson ... ... ... | 171 | 144 | 197 | 91 | 183 | 138 | 924 |

## RANGEVILLE STATE SCHOOL, TOOWOOMBA.

Mr. Thos. Henderson, head teacher of the Rangeville State School, Toowoomba, sends in the following interesting account of rural studies and practical utility work in which his pupils are instructed. It is worthy of note that many of the State school teachers—as, for instance, Mr. R. G. Bartlett, head teacher of the State school, Budeiim Mountain and others—are doing excellent work in instructing the pupils in various branches of rural industries, which work cannot fail to be of much benefit to the latter and incidentally to the State.

"In conjunction with the practical nature study work carried on by the boys and girls of Rangeville School, it was decided to add poultry-keeping from a utility point of view. Several well-known breeders—Messrs. Parker and Smith, of Brisbane, and Becker, of Toowoomba—presented the school with a pen of six White Leghorn pullets. These three breeders each have a pen competing in the Gatton College laying competition. Mr. F. A. Robinson, of Toowoomba, also presented two roosters—one of pure Padman blood and one by a Yangarella cockerel from Padman hens. The manager of Yangarella Yards also presented a pure Padman bird. Mr. Becker's pen is housed in a Philo summer coop, and the pens of Messrs. Parker and Smith are each in a pen 6 ft. square and about 6 ft. high on a semi-Gordon system.

"Horse manure is used for scratching material. The ammonia in the manure keeps the birds free from vermin. The fowls are attended to entirely by the children, whose ages range from nine to thirteen years. The monitors are changed weekly, two boys looking after each pen, and two girls attend the chickens, which are housed in a Philo chicken-coop, and sleep in a fireless brooder. This system of changing the monitors gives every child an opportunity of personally attending to the fowls. The birds are fed on dry mash, which is always in hoppers before them. Grain is given in the evening and dug into the scratching material to make the birds work for their food. Dried blood is used as a substitute for animal food. Green feed is given daily, and is suspended in the air by a wire from the roof. Salts are given once a week in the drinking water. The houses are cleaned daily.

"As well as being educational to the children, the object is also patriotic. There is a hospital ('Finchley') at Toowoomba for wounded soldiers, and many who are incapacitated for hard labour could make a living from poultry-raising, and a visit to the school shows them two systems of running the birds. Settings also, free of charge, will be supplied to those wounded soldiers who intend to go in for poultry-raising.

"The scholars are keenly interested in this new branch of nature knowledge, and are all anxious for their turns to act as monitors.

"The following are the numbers of eggs laid by the respective pens for the month of October:—Mr. Smith's birds got a bad start off, but now seem to have settled down to business; Mr. Parker's pen (Mars Poultry Farm), laid 138 eggs; Mr. Becker's pen, 122 eggs; Mr. Smith's pen, 112 eggs."

## A TOWERS POULTRY FARM.

We are indebted to Mr. J. W. Ward, Charters Towers, for the following description of a thriving poultry farm near the Weir at that town, owned and conducted by Mrs. Rose, and her young son and daughter. The success which has been achieved by her should surely be an incentive to others to go and do likewise:—

"In travelling to the Weir at Charters Towers one would not think for a moment that they passed within a quarter of a mile, at most, of one of the most up-to-date poultry farms in Queensland. This writer has certainly not seen anything like it this side of Petuluma, near San Francisco, California. Some two or more years ago I called on the then owner, Mr. Pass, of the Defiance Poultry Farm, and in looking around I complimented him upon his up-to-date stock and method. I said, 'Man, you must do well. I am sure nobody in this district knows what a fine little concern you have here.' Mr. Pass replied, in his short curt way, 'No; and neither do I want them to know until I have my plant and stock complete.' He requested me at that time never to mention his farm in the Press, or to outsiders, until he gave me permission. That request has been kept sacred until recently. Since then the farm has changed hands, and is now owned by Mrs. Rose, and, with her permission, I now write you of this well-kept, up-to-date model hen farm.

"Mrs. Rose, with the help of her boy and girl (when not at school), looks after and feeds anything from 700 to 1,000 fowls, besides some 900 to 1,200 young chickens of all ages, from four days to several weeks old. Could anyone imagine a woman looking after three incubators, hatching anything from 75 to 100 chickens at a time and taking care of these young chicks in their different foster-mother homes. Why, it is quite a sight to see 80 to 120 little toddlers running around in their little foster-mother coops, when feeding time comes, and when the feeding is over to watch these little chicks running into an adjoining coop where a kerosene lamp is burning in a kerosene tin, giving off heat to keep them warm at nights; and then as they grow older they are passed out into the larger enclosure, later to be separated, the males from the females—the one (male) to go out on to the table, and the female to keep up the process of egg supplies.

"It is indeed an interesting subject, and to visit this farm is quite an eye-opener to those who have not been there before. It has been my lot within recent months to take visitors to see the farm, and they have come away surprised at what was seen.

"Quite recently Mrs. Rose has sold over 300 of her hens, at prices varying from 5s. to 7s. 6d. each. They are the White Leghorn variety, and prize fowls, coming from a 245-egg strain. Just imagine a well-looked-after hen giving from 200 to 300 eggs per annum, and one can safely say the product will average at least 1s. 6d. per dozen all the year through. There is no doubt these fowls are well looked after, and the

corn and wheat is ground or crushed so that everything is made easy for them.

"Herein is an object lesson of what can be done in this district. Here we have two 40-acre homesteads, two horses, two carts and harness, five incubators, two decent cottages, windmill, pumps, and plant. The fenced-off hen-runs have their little coops in each enclosure. Mr. Rose and Mr. Pass have taken up an island named Phantom Island, near Palm Island, where they are now planting fruit trees as well as getting ready to go into fowl-rearing in a much bigger way than locally. In addition to the plant mentioned above, 700 laying hens, giving at the very least 200 dozen per week worth at least 1s. 6d. per dozen, besides the fowls to be disposed of, and anything from 800 to 1,200 young chicks varying from a few days to a few weeks old.

"This is but one more self-evident and concrete case, showing what can be done with application and ambition to push on and make a success of things. The little farm under consideration, a few years ago, was commenced with just a few fowls, and has grown to quite decent dimensions, and there is no earthly reason why we should not have more of these places around us. There is any amount of room for development. Only within the last month a representative of a Townsville firm was here quite ready to buy out all the eggs and all the fowls at the Defiance Fowl Farm.

"Western Queensland takes quite a large number of eggs. Townsville imports from South, and there is quite a good opening for the egg and hen industry here. This industry in the United States is the very biggest industry they have, running into hundreds of millions annually, and even in the Southern portion of Queensland it is getting quite a big business. Eggs can be bought South at about 8½d. to 10d. per dozen at the present time, and yet there is a plentiful market here at 1s. 3d. per dozen, and then supplies are short.

"Here we have a calling or industry quite suitable for women, and yet so little of it is done. Even we are so far away from the centre of government that the heads of the departments never care whether the people at great distances from the seat of government learn anything or not. Neither the fowl experts nor any other experts call here, except for a passing visit; they are here to-day and gone to-morrow—not as in Southern Queensland, when they are sent out during the week and come home for week ends.

"One fact stands out boldly—that there are other means of getting a decent livelihood rather than running around looking for a boss at so much per week. All that is needed is men and women with a bit of pluck and ambition to strike out for themselves. Our community would be the better for such, and much real progress from a wealth-producing point of view would soon be seen if men and women could be induced to try and make a success of getting wealth from the surface of the land."

# General Notes.

## FEEDING PIGS: A STARTLING STATEMENT.

A somewhat startling statement appeared in one of our exchanges (says the "London Live Stock Journal"). It is as follows:—"Lewes and Gilbert, at Rothamsted, in a ten weeks' feeding trial with pigs weighing 135 lb. each and feeding to a weight of 275 lb., found at the start 386 lb. of food provided 100 lb. of live weight. At the end of four weeks 502 lb. were necessary, and in the ninth and tenth weeks 610 lb."

This is an extraordinary result, if it be correct, as it shows that more than twice as much meal was required to produce 1 lb. of meat by a pig weighing about 250 lb. than could be manufactured by the same pig when it weighed about half the weight some nine weeks previously. Should this be proved in general practice to be true, how great an advantage has a young pig in the manufacture of meat over one of more mature age after a period of good living!

The question arises, have our specialists given sufficient attention to the more profitable system of fattening our pigs to light weights when they are young?

## A USE FOR SURPLUS PLUMS.

### PLUM WINE.

The "Farmer and Settler," Sydney, writes: "Plum wine is easy to make on the farm," and gives the following simple recipes:—

Now that plums are in season, and some farm folk have more than they can use as jam or bottled fruit, they may like to experiment with plum wine, using the following recipes recommended by the New Zealand Department of Agriculture:—

#### DRY PLUM WINE.

Place plums in a copper or enamel jam-making bowl and cover with water. Boil, and when boiling simmer for half an hour; strain into wooden vessels (casks for preference). Add ½ lb. to ¾ lb. of good sugar to each gallon of liquid and allow to ferment until dry—*i.e.*, until all the sugar has disappeared. Then allow to stand for seven days, after which rack the clear liquid off into another vessel, and allow it to stand for another fortnight. Then rack again and bung the cask up airtight. The wine will be ready for use in three to six months.

#### SWEET PLUM WINE.

Proceed as in the making of dry plum wine; but when adding sugar add ½ lb. per day per gallon of juice until 5 lb. per gallon has been added; then allow to ferment. When fermentation is completed, if not sweet enough, add more sugar until the wine is sufficiently sweet to be palatable. Then add 4 oz. of potassium bisulphide per 100 gallons, and 7 gallons of grape spirit—7 gallons grape spirit from 40 o.p. (overproof) to 65 o.p. to be used to every 100 gallons of liquid. This should be ready for use in six to nine months.

These are alcoholic wines, and are therefore too strong for consumption by young people.

## DEHAIRING MARSUPIAL SKINS.

Mr. M. J. Gallagher, Kedron Tannery, gives the following recipe to the "Farm Bulletin," 1st December, 1916:—

"Take an empty hogshead and cut in halves. You have now got two pits which will contain about 18 to 20 gallons water each. Half fill one with water, then in the other half slack some lime and pour into the half containing the water. Place the skins in this solution as flat as possible and lift out for a few minutes every day. It will take from six to ten days before the hair is sufficiently loose to scrape off with a blunt knife. Before putting the skins into the lime they will have to be thoroughly soaked and scraped on the flesh several times.

"Use ½ lb. to 1 lb. of lime for each skin according to size; dissolve the lime in half a gallon of water."

## COTTON IN THE LIVERPOOL MARKET.

The following are the official "Spot" prices in Liverpool at the end of November, 1916, and on the corresponding dates in 1915, 1914, and 1913:—

| — | 1916. | 1915. | 1914. | 1913. |
|---|---|---|---|---|
| "Middling" American .. .. | 11·42 | 6·88 | 4·66 | 7·42 |
| "Fair" Pernam .. .. .. | 12·20N | 7·52N | 5·12 | 7·61 |
| "Fully Good Fair" Egyptian .. | 20·20N | 9·50N | 7·20 | 10·20 |
| "Fine" Broach .. .. .. | 10·90N | 6.50 | 4·95 | 6 15/16N |
| "Fine" No. 1 Oomra .. .. .. | 8·95N | 5·55N | 4·25N | 6 7/16N |
| "Fine" Bengal .. .. .. | 8·35N | 5·05 | 3·26 | 5 5/8N |

# Answers to Correspondents.

## CATERPILLARS ATTACKING CEDAR TREES.

"B.M.B.," Jundah Station, Cairns—

The caterpillars attacking your cedar trees are, most likely, the larval or caterpillar state of one of the many small moths which attack our forest and other trees. We should be glad to receive specimens of this caterpillar at an early date, to enable us to identify the species. All insects that devour their food can be occasionally combated with any one of the many arsenical prepartions. Paris Green is perhaps the cheapest. In mixing same, place the Paris Green in a cup or billy, add a little water, and mix in the same way as mustard is mixed for table use. Add more water slowly, stirring well all the time. Paris Green should not be used much stronger than 2 oz. to 20 gallons of water (five kerosene tins full). Arsenate of lead is also a good and reliable insecticide, and can be purchased from all seedsmen in tins, on which are full directions for mixing and application. The Paris Green should be sprayed on to the tree in as fine a spray as possible, stirring the mixture to prevent sediment settling to the bottom of the vessel. It is an active poison, and great care should be taken to keep all vessels used in the mixing for that purpose alone, and it should be kept out of the way of children and domestic animals.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JANUARY, 1917.

| Article. | | JANUARY. |
|---|---|---|
| | | Prices. |
| Bacon | lb. | 9d. to 1s. |
| Barley | bush. | 4s. 3d. |
| Bran | ton | £5 15s. |
| Broom Millet | „ | £22 to £24 |
| Butter | cwt. | 149s. 4d. |
| Chaff, Mixed | ton | £4 |
| Chaff, Oaten | „ | £4 10s. to £5 10s. |
| Chaff, Lucerne | „ | £3 to £3 10s. |
| Chaff, Wheaten | „ | £4 |
| Cheese | lb. | 8d. to 8½d. |
| Flour | ton | £12 |
| Hams | lb. | 1s. 3d. to 1s. 4d. |
| Hay, Oaten | ton | £4 10s. |
| Hay, Lucerne | „ | £1 10s. |
| Honey | lb. | 4d. to 5d. |
| Maize | bush. | 2s. 11d. to 4s. |
| Oats | „ | 2s. 6d. to 3s. |
| Onions | ton | £9 |
| Peanuts | lb. | 3d. to 4d. |
| Pollard | ton | £5 5s. |
| Potatoes | „ | £5 to £5 10s. |
| Potatoes (Sweet) | cwt. | 3s. 6d. to 4s. |
| Pumpkins (Cattle) | ton | £1 10s. to £2 10s. |
| Eggs | doz. | 9d. to 1s. 4d. |
| Fowls | pair | 4s. to 6s. |
| Ducks, English | „ | 4s. to 4s. 6d. |
| Ducks, Muscovy | „ | 7s. to 8s. |
| Geese | „ | 10s. to 11s. |
| Turkeys (Hens) | „ | 12s. to 13s. |
| Turkeys (Gobblers) | „ | 18s. to 24s. |
| Wheat | bush. | 2s. 3d. to 3s. 4d. |

## VEGETABLES—TURBOT STREET MARKETS.

| | |
|---|---|
| Asparagus, per bundle | ... |
| Cabbages, per dozen | 2s. to 6s. 6d. |
| Cauliflowers, per dozen | ... |
| Celery, per bundle | ... |
| Cucumbers, per dozen | ... |
| Beans, per sugar bag | 2s. to 3s. 6d. |
| Peas, per sugar bag | 4s. to 6s. |
| Carrots, per dozen bunches | 4d. to 9d. |
| Chocos, per quarter-case | 1s. 6d. to 2s. |
| Beetroot, per dozen bunches | 8d. to 9d. |
| Marrows, per dozen | 1s. to 2s. |
| Lettuce, per dozen | 2d. to 6d. |
| Parsnips, per dozen bunches | 6d. to 9d. |
| Sweet Potatoes, per sugar bag | 1s. 6d. to 1s. 9d. |
| Table Pumpkins, per dozen | 1s. 6d. to 2s. 6d. |
| Tomatoes, per quarter-case | 4s. to 6s. |
| Vegetable Marrows, per dozen | ... |
| Turnips, per dozen bunches | ... |
| Rhubarb, per dozen bundles | .. |

## SOUTHERN FRUIT MARKETS.

| Article. | JANUARY. Prices. |
|---|---|
| Bananas (Queensland), per case ... ... ... ... ... | 10s. to 12s. |
| Bananas (Fiji), per case ... ... ... ... ... ... | 17s. 6d. to 19s. |
| Bananas (G.M.), per case ... ... ... ... ... | 19s. to 21s. |
| Custard Apples, per tray ... ... ... ... ... ... | ... |
| Lemons (Local), per bushel-case ... ... ... ... ... | 6s. to 10s. |
| Mandarins, per case ... ... ... ... ... ... | ... |
| Mangoes, per bushel-case ... ... ... ... ... ... | 6s. to 8s. |
| Oranges (Navel), per case ... ... ... ... ... | ... |
| Oranges (other), per case ... ... ... ... ... ... | ... |
| Pears, per case ... ... ... ... ... ... | ... |
| Papaw Apples, per half-bushel-case ... ... ... ... | 3s. to 7s. |
| Passion Fruit, per half-case ... ... ... ... ... | ... |
| Persimmons, per half-case ... ... ... ... ... | ... |
| Pineapples (Queens), per double-case ... ... .. ... | 8s. to 12s. |
| Pineapples (Ripleys), per double-case ... ... ... ... | 5s. to 7s. |
| Pineapples (Common), per double-case ... ... ... ... | 5s. to 7s. |
| Strawberries (Local), per dozen punnets* ... ... ... | 5s. to 12s. |
| Tomatoes (Queensland), per half-bushel-case ... ... ... | 2s. to 5s. |

* 1 punnet = 1 quart.

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | JANUARY. Prices. |
|---|---|
| Apples, Eating, per case ... ... ... ... ... ... | 8s. to 12s. |
| Apples, Cooking, per case ... ... ... ... ... ... | 5s. to 8s. |
| Apricots, per quarter-case ... ... .. ... ... ... | 1s. 6d. to 4s. 6d. |
| Bananas (Cavendish), per dozen ... ... ... ... ... | 1½d. to 4d. |
| Bananas (Sugar), per dozen ... ... ... ... ... | 1½d. to 2¾d. |
| Cape Gooseberries, per case ... ... ... ... ... ... | ... |
| Cocoanuts, per sack ... ... ... ... ... ... | 12s. to 15s. |
| Cumquats, per quarter-case ... ... ... ... ... | 3s. 6d. to 4s. 9d. |
| Custard Apples, per quarter-case ... ... ... ... | ... |
| Granadillas, per quarter-case ... ... ... ... ... | ... |
| Lemons, per case ... ... ... ... ... ... | 6s. to 12s. |
| Limes, per quarter-case ... ... ... ... ... ... | .. |
| Mandarins, per case ... ... ... ... ... ... | 12s. to 13s. |
| Mangoes, per case ... ... ... ... ... ... ... | 5s. to 8s. |
| Nectarines, per cwt. ... ... ... ... ... ... | 1s. to 3s. |
| Oranges, (Navel), per case ... ... ... ... ... ... | 9s. to 10s. |
| Oranges (other), per case ... ... ... ... ... ... | 4s. to 8s. |
| Papaw Apples, per case ... ... ... ... ... ... | 9d. to 1s. |
| Passion Fruit, per quarter-case ... ... ... ... ... | 1s. to 1s. 9d. |
| Peaches, per quarter-case ... ... ... ... ... | 1s. to 3s. 6d. |
| Pears, (local), per quarter-case ... ... ... ... ... | 2s. 6d. to 4s. |
| Peanuts, per pound ... ... ... ... ... ... ... | 3d. to 4d. |
| Persimmons, per quarter-case ... ... ... ... ... | ... |
| Plums, per quarter-case ... ... ... ... ... ... | 2s., 3s. 6d. |
| Pineapples (Ripleys), per dozen ... ... ... ... ... | 1s. to 3s. |
| Pineapples (Rough), per dozen ... ... ... ... ... | 9d. to 1s. 6d. |
| Pineapples (Smooth), per dozen ... ... ... ... ... | 1s. 6d. to 3s. |
| Quinces, per case ... ... ... ... ... ... ... | ... |
| Rockmelons, per dozen ... ... ... ... ... ... | ... |
| Strawberries, per dozen boxes ... ... ... ... ... | ... |
| Tomatoes, per quarter-case ... ... ... ... ... | 4s. to 6s. |
| Watermelons, per dozen ... ... ... ... ... ... | 2s. 6d. to 7s. |

## TOP PRICES, ENOGGERA YARDS, DECEMBER, 1916.

| Animal. | DECEMBER. Prices. |
|---|---|
| Bullocks ... ... ... ... ... ... ... ... | £18 15s. to £20 7s. 6d. |
| Cows ... ... ... ... ... ... ... ... | £12 17s. 6d. to £15 2s. 6d. |
| Merino Wethers ... ... ... ... ... ... ... | 32s. 3d. |
| Crossbred Wethers ... ... ... ... ... ... | 38s. 9d. |
| Merino Ewes ... ... ... ... ... .. ... | 26s. 9d. |
| Crossbred Ewes ... ... ... ... ... ... ... | 30s. |
| Lambs ... ... ... ... ... ... ... ... | 30s. |
| Pigs (Porkers) ... ... ... ... ... ... ... | 66s. |

## ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

### TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON

On account of the alteration of Civil (Clock) Time which took place on 1st January, it is necessary to *add one hour* to all the times given on this page till the last Sunday in March.

| 1917. | JANUARY. | | FEBRUARY. | | MARCH. | | APRIL. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 4·57 | 6·46 | 5·21 | 6·41 | 5·41 | 6·19 | 5·58 | 5·46 |
| 2 | 4·58 | 6·46 | 5·22 | 6·41 | 5·41 | 6·18 | 5·59 | 5·45 |
| 3 | 4 59 | 6·46 | 5·23 | 6·40 | 5·42 | 6·17 | 5·59 | 5·44 |
| 4 | 4·59 | 6·46 | 5·24 | 6·40 | 5·43 | 6·16 | 6·0 | 5·43 |
| 5 | 5·0 | 6·46 | 5·25 | 6·39 | 5·44 | 6·15 | 6·0 | 5·42 |
| 6 | 5·1 | 6·47 | 5·25 | 6·39 | 5·45 | 6·14 | 6·1 | 5·41 |
| 7 | 5·2 | 6·47 | 5·26 | 6·38 | 5·45 | 6·13 | 6·1 | 5·39 |
| 8 | 5·3 | 6·47 | 5·27 | 6·37 | 5·46 | 6·12 | 6·2 | 5·38 |
| 9 | 5 3 | 6·47 | 5·28 | 6·36 | 5·46 | 6·11 | 6·2 | 5 37 |
| 10 | 5·4 | 6·48 | 5·29 | 6·35 | 5·47 | 6·10 | 6·3 | 5·36 |
| 11 | 5·5 | 6·48 | 5·29 | 6·35 | 5·47 | 6·9 | 6·3 | 5·35 |
| 12 | 5·6 | 6·47 | 5·30 | 6·34 | 5·48 | 6·8 | 6·4 | 5·34 |
| 13 | 5·6 | 6·47 | 5·31 | 6·33 | 5·48 | 6·7 | 6·4 | 5·33 |
| 14 | 5·7 | 6·47 | 5·32 | 6·32 | 5·49 | 6·6 | 6·5 | 5·32 |
| 15 | 5·8 | 6·47 | 5·32 | 6·32 | 5·49 | 6·5 | 6·5 | 5·31 |
| 16 | 5·9 | 6·47 | 5·33 | 6·31 | 5·50 | 6·3 | 6·6 | 5·30 |
| 17 | 5·9 | 6·47 | 5·34 | 6·30 | 5·50 | 6·2 | 6·6 | 5·29 |
| 18 | 5·10 | 6·47 | 5·35 | 6·29 | 5·51 | 6·1 | 6·7 | 5·28 |
| 19 | 5·11 | 6·47 | 5·35 | 6·28 | 5·51 | 6·0 | 6·7 | 5·27 |
| 20 | 5·12 | 6·46 | 5·36 | 6·28 | 5·52 | 5·59 | 6·8 | 5·26 |
| 21 | 5·13 | 6·46 | 5·37 | 6·27 | 5·52 | 5·58 | 6·8 | 5·25 |
| 22 | 5·13 | 6·46 | 5·37 | 6·26 | 5·53 | 5·57 | 6·8 | 5·24 |
| 23 | 5·14 | 6·45 | 5·38 | 6·25 | 5·53 | 5·56 | 6·9 | 5·23 |
| 24 | 5·15 | 6·45 | 5·38 | 6·24 | 5·54 | 5·55 | 6·9 | 5·23 |
| 25 | 5·16 | 6·45 | 5·39 | 6·23 | 5·54 | 5·54 | 6·10 | 5·22 |
| 26 | 5·16 | 6·44 | 5·39 | 6·22 | 5·55 | 5·52 | 6·10 | 5·21 |
| 27 | 5·17 | 6·44 | 5·40 | 6·21 | 5·55 | 5·51 | 6·11 | 5·20 |
| 28 | 5·18 | 6·43 | 5·40 | 6·20 | 5·56 | 5·50 | 6·11 | 5·19 |
| 29 | 5·19 | 6·43 | ... | ... | 5·57 | 5·49 | 6·12 | 5·18 |
| 30 | 5·19 | 6·42 | ... | ... | 5·57 | 5·48 | 6·12 | 5·18 |
| 31 | 5·20 | 6·42 | ... | .. | 5·58 | 5·47 | ... | ... |

The Phases of the Moon commence at the times stated in Queensland, New South Wales, and Victoria only.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 8 Jan., | ○ | Full Moon | 5 | 42 | p.m. |
| 16 ,, | ☽ | Last Quarter | 9 | 42 | ,, |
| 23 ,, | ● | New Moon | 5 | 40 | ,, |
| 30 ,, | ☾ | First Quarter | 11 | 1 | a.m. |

There will be a total eclipse of the moon on 8th Jan. before it rises in Queensland, but the moon will still be partly in the shadow of the earth for about three-quarters of an hour after it becomes visible. It will be farthest from the earth on the 9th January, and nearest on the 23rd.

| | | | | | |
|---|---|---|---|---|---|
| 7 Feb., | ○ | Full Moon | 1 | 28 | p.m. |
| 15 ,, | ☽ | Last Quarter | 11 | 53 | a.m. |
| 22 ,, | ● | New Moon | 4 | 9 | ,, |

It will be farthest from the earth on the 6th Feb., and nearest on the 21st.

| | | | | | |
|---|---|---|---|---|---|
| 1 Mar. | ☾ | First Quarter | 2 | 43 | a.m. |
| 9 ,, | ○ | Full Moon | 7 | 58 | ,, |
| 16 ,, | ☽ | Last Quarter | 10 | 33 | p.m. |
| 23 ,, | ● | New Moon | 2 | 5 | ,, |
| 30 ,, | ☾ | First Quarter | 8 | 36 | ,, |

It will be farthest from the earth on the 5th about midnight, and nearest on the 21st about 7 p.m.

| | | | | | |
|---|---|---|---|---|---|
| 7 Apr. | ○ | Full Moon | 11 | 49 | p.m. |
| 15 ,, | ☽ | Last Quarter | 6 | 12 | a.m. |
| 22 ,, | ● | New Moon | 12 | 1 | ,, |
| 29 ,, | ☾ | First Quarter | 3 | 22 | p.m. |

It will be farthest from the earth on the 2nd and on the 30th, and nearest on the 18th.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset may be roughly arrived at by adding 17 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

The approximate times of sunrise and sunset at Rockhampton can be obtained by adding one hour till 26th March, and the following numbers of minutes to the times given for Brisbane:—

On 1st February for sunrise add 16 m., reducing gradually to 13 m. on 28th.

On 1st February for sunset add 4 m., increasing gradually to 6 m. on 28th.

On 1st March for sunrise add 13 m., reducing gradually to 9 m. on 31st.

On 1st March for sunset add 7 m., increasing gradually to 10 m. on 31st.

On 1st April for sunrise add 9 m., reducing gradually to 5 m. on 30th.

On 1st April for sunset add 9 m., increasing gradually to 14 m. on 30th.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF DECEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING DECEMBER, 1916 AND 1915, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | | Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|---|---|---|---|---|
| | Dec | No. of Years' Records. | Dec., 1916. | Dec., 1915. | | Dec. | No. of Years' Records. | Dec., 1916. | Dec., 1915. |
| *North Coast.* | In. | | In. | In. | *South Coast*—continued: | In. | | In. | In. |
| Atherton ... ... | 7·10 | 15 | 17·74 | 9·15 | | | | | |
| Cairns ... ... | 8·99 | 34 | 25·13 | 16·64 | Nambour ... ... | 6·03 | 20 | 13·80 | 2·35 |
| Cardwell ... ... | 8·14 | 44 | 24·15 | 8·64 | Nanango ... ... | 3·64 | 34 | 3·39 | 4·05 |
| Cooktown ... ... | 6·67 | 40 | 16·63 | 8·71 | Rockhampton ... | 4·33 | 29 | 9·44 | 2·03 |
| Herberton ... ... | 5·35 | 29 | 13·81 | 8·56 | Woodford ... ... | 5·25 | 29 | 11·02 | 1·33 |
| Ingham ... ... | 6·28 | 24 | 24·98 | 9·07 | | | | | |
| Innisfail ... ... | 11·91 | 35 | 29·99 | 18·81 | *Darling Downs.* | | | | |
| Mossman ... ... | 16·41 | 4 | 26·43 | 13·89 | | | | | |
| Townsville ... ... | 5·44 | 45 | 17·99 | 3·22 | Dalby ... ... | 3·14 | 46 | 1·64 | 2·18 |
| | | | | | Emu Vale ... ... | 3·49 | 20 | 2·51 | 4·22 |
| *Central Coast.* | | | | | Jimbour ... ... | 3·22 | 28 | 1·04 | 2·26 |
| | | | | | Miles ... ... | 2·57 | 31 | 2·07 | 1·46 |
| Ayr ... ... ... | 3·56 | 29 | 8·31 | 1·88 | Stanthorpe ... | 3·45 | 43 | 2·59 | 3·13 |
| Bowen ... ... | 4·13 | 45 | 11·04 | 1·23 | Toowoomba ... | 4·19 | 44 | 3·72 | 4·55 |
| Charters Towers ... | 3·50 | 34 | 10·69 | 5·06 | Warwick ... ... | 3·46 | 29 | 2·26 | 3·92 |
| Mackay ... ... | 6·76 | 45 | 17·56 | 7·40 | | | | | |
| Proserpine ... ... | 7·79 | 13 | 24·54 | 7·89 | | | | | |
| St. Lawrence ... | 4·28 | 45 | 8·45 | 4·18 | *Maranoa.* | | | | |
| | | | | | Roma ... ... | 2·32 | 42 | 3·38 | 1·30 |
| *South Coast.* | | | | | | | | | |
| | | | | | *State Farms, &c.* | | | | |
| Biggenden ... ... | 4·74 | 17 | * | 2·39 | | | | | |
| Bundaberg ... ... | 4·45 | 33 | 6·63 | 3·12 | | | | | |
| Brisbane ... ... | 5·02 | 65 | 5·10 | 1·33 | Bungeworgorai ... | 2·76 | 4 | 5·69 | 0·91 |
| Childers ... ... | 5·23 | 21 | 6·29 | 3·72 | Gatton College ... | 3·32 | 17 | 2·63 | 1·37 |
| Crohamhurst ... | 7·26 | 25 | 12·33 | 2·52 | Gindie ... ... | 2·58 | 17 | 9·82 | 1·15 |
| Esk ... ... ... | 4·35 | 29 | 2·93 | 1·85 | Hermitage ... | 2·64 | 10 | 2·82 | 3·57 |
| Gayndah ... ... | 3·86 | 45 | 3·38 | 2·77 | Kairi ... ... | 9·60 | 4 | 18·89 | 8·06 |
| Gympie ... ... | 5·89 | 46 | 5·31 | 7·37 | Kamerunga ... | 6·90 | 27 | 23·58 | 7·85 |
| Glasshouse M'tains | 6·64 | 8 | 14·24 | 1·39 | Sugar Experiment Station, Mackay | 7·99 | 19 | 24·44 | 8·47 |
| Kilkivan ... ... | 4·28 | 37 | 3·98 | 3·58 | Warren ... ... | 4·61 | 4 | 7·93 | 1·72 |
| Maryborough ... | 4·49 | 45 | 5·59 | 2·37 | | | | | |

* Incomplete.

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for December this year and for the same period of 1915, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
Divisional Officer.

# Farm and Garden Notes for March.

FIELD.—Take every opportunity of turning up the ground in readiness for sowing and planting winter crops. The main crop of potatoes should at once be planted. As the growth of weeds will now be slackening off, lucerne may be sown on deeply cultivated soil. The latter should be rich and friable, with a porous subsoil. The land should be thoroughly pulverised. Do not waste time and money in trying to grow lucerne on land with a stiff clay subsoil. Prepare the land a couple of months before sowing, care being taken to cross plough and harrow before the weeds have gone to seed. This ensures a clean field. Sow either broadcast or in drills. In the former case, 20 lb. of seed will be required; in the latter, 10 lb. A good stand of lucerne has been obtained with less quantities. Should weeds make their appearance before the plants have sent down their tap roots, mow the field. Before they can again make headway enough to do any damage, the lucerne will be strong enough to hold its own against them. Harrow and roll the land after mowing. Gather all ripe corn. It is now too late to sow maize, even 90-Day, with any certainty of harvesting a crop of grain. Rye grass, prairie grass, oats, barley (in some districts, wheat), sorghum, vetches, carrots, mangolds, and Swede turnips may be sown. In Northern Queensland, sow tobacco seed, cowpea, carob beans, sweet potatoes, opium poppy, &c. Sow anatto, jack fruit, and plant kola-nut cuttings. Some temperate-zone vegetables may be planted, such as egg plants, potatoes, &c. Coffee-planting may be continued. Harvest kafir corn and paddy.

FLOWER GARDEN.—Now is the time to plant out bulbs. A complete garden could be furnished with these charming plants, which are to be had in every colour and variety. Amongst the many are—Amaryllis, anemone, arum, babiana, crinum, crocus, freesia, ranunculus, jonquils, iris, ixias, gladiolus, narcissus, Jacobean lilies, tigridia, tritonia.

All bulbs like well-drained, somewhat sandy soil, with a plentiful admixture of leaf mould. Herbaceous plants and annuals which it is intended to raise from seed should be sown this month. Such are antirrhinums (snapdragon), asters, cornflowers, dianthus, larkspurs, daises, cosmea, candytuft, lupins, gaillardias, godetia, mignonette, poppies, pansies, phlox, sweet peas. Cannas now planted will require plenty of food in the shape of liquid manure. Put in cuttings of carnations. Chrysanthemums require attention in the way of disbudding, staking, watering with liquid manure, &c. Growers for exhibition will thin out to a few buds and protect the flowers from rain and sun. Dahlias should be looking well. To secure fine blooms, disbudding should be done.

Now, as to climbers which may now be planted. These are—*Allamanda Schotii* (beautiful yellow), *Antigonon leptopus,* a charming

cerise-coloured climber; *Aristolochia elegans*, handsome as an orchid and easily grown; *Aristolochia ornithocephala* (Dutchman's Pipe), very curious, large, always attracts attention; *Asparagus plumosa* grows in any shady place; *Beaumontia grandiflora*, splendid white flower, grand for a fence, will grow 50 ft. high; Bignonias of several kinds; Bougainvilleas, with their splendid leafy pink and purple flowers, rapidly clothe a fence or unsightly shed with a blaze of blossom; *Quisqualis indica*, a fine creeper, flower pink, changing to white; Wistaria, purple and white. Most beautiful is the *Bauhinia scandens*, rarely seen about Brisbane. We grew a plant of this climber at Nundah, and it soon closed in the front of the veranda for a distance of over 80 ft. The leaves are very small, and in the flowering season it presents almost a solid mass of beautiful round bunches of blossoms, something like the hawthorn bloom —pink and white. It seeds freely, but the seeds are difficult to germinate, and when they have produced a plant it is still more difficult to rear it. A rooted sucker from the main stem will in all probability grow.

KITCHEN GARDEN.—During this month a very large variety of vegetable seeds may be sown in readiness for planting out where necessary in the autumn, which begins on the 20th of March. All unoccupied land should be roughly dug, and, where required, add well-decomposed manure. Transplant cabbage, cauliflower, celery, &c. Sow French beans, beet, carrot, turnips, radish, cabbage, cauliflower, cress, peas, mustard, &c. Former sowings should be thinned out and kept clear of weeds. Mulch round melon and cucumber beds with a good dressing of long stable manure, as it assists in keeping the fruit clean and free from damp. Cucumbers, melons, French beans, and tomatoes should be looked for every day and gathered, whether required or not, for, if left on the vines to perfect their seeds, the plants will soon cease to be productive, or will form inferior, ill-shaped, and hence unsaleable fruit.

# Orchard Notes for March.

## THE SOUTHERN COAST DISTRICTS.

The marketing of the main crop of pineapples will continue to occupy the attention of growers; and as it is probable that the plantations have been allowed to get somewhat dirty during the previous month, they should be cleaned up as soon as ever the crop has been got off. The fruit of the new crop of citrus fruit will be showing signs of ripening towards the end of the month; and as the fruit during this period of its growth is very liable to the attack of insect pests of various kinds, it is important that steps should be taken to prevent loss arising from this cause as far as possible.

Large sucking moths of several kinds attack the fruit as soon as it shows signs of ripening; and as they always select the first fruit that shows signs of colouring, it is a good plan to gather a few forward fruit and to ripen them up quickly by placing them on the barn floor, and covering them up with bags or straw. They will turn colour in a few days, and develop the characteristic scent of the ripening fruit. The fruit so treated should be hung up in conspicuous places in the orchard as trap-fruit, as not only will it attract the moths, but also the fruit-flies. The moths will be found clustered round the trap-fruits in large numbers, and can then be easily caught and destroyed. Fruit-fly will also puncture such fruit; and if the fruit is destroyed before the larvæ reach maturity, a later crop of these insects is prevented from hatching out. Fruit-flies may also be caught in large numbers by means of such artificially ripening fruits. The fruits are smeared with tanglefoot, and hung about the orchard. The fly, attracted by the colour, settles on the fruit, and is caught in a similar manner to house-flies on specially prepared sticky paper. These simple remedies, if carefully carried out, will result in the destruction of large numbers of sucking moths and fruit-flies.

The yellow peach-moth that does such damage to peaches in spring, and that attacks corn, sorghum, cotton bolls, custard apples, and many other plants and fruits, often does a lot of damage to citrus fruits. It acts in a very similar manner to the second and later generations of the Codling moth of pomaceous fruits, in that it lays its eggs where two fruits touch, under the shelter of a leaf on the fruit, (at the stem end of the fruit, and, in the case of navel oranges, in the navel itself; in fact, anywhere that there is a likelihood of the egg not being disturbed. The egg hatches out into a small spotted caterpillar, which eats its way into the fruit, causing it to ripen prematurely, and fall off. Where two fruits touch, it often eats into and destroys both, and it frequently leaves one fruit to go and destroy a second. It is a very difficult insect to deal with, owing to the number of fruits and plants on which it lives; but, as far as citrus fruits are concerned, the best remedy is undoubtedly to spray the fruit with a remedy that will destroy the young insect when it starts to eat the skin of the fruit. Bordeaux mixture has been found efficacious, but I am of opinion that spraying with Paris green and lime, Kedzie's mixture, or arsenite of lead, will also have good results. The latter poison is, in my opinion, well worth giving a thorough test, as it sticks to the fruit and leaves for a long time. Bordeaux mixture, either alone or in conjunction with Paris green or Kedzie's mixture, is, however, a good remedy, as not only will it destroy the larvæ or prevent the moth from attacking the tree, but it is also the best remedy for black brand or melanose, as well as tending to keep all other fungus pests in check. Fight fruit-fly systematically—both by means of the sticky fruit already recommended and by gathering all fly-infested fruit, such as guavas, late mangoes, kumquats, &c., as well as any oranges or mandarins that may have been infested, as if kept in check now there will be little loss throughout the season. A little fruit will be marketed towards the end of the month. See that it is gathered and sweated for seven days before

marketing, and don't gather it too immature. Beauty of Glen Retreat mandarins are often gathered and marketed as soon as they show signs of colouring. They are then as sour as a lemon, and anyone who is unlucky enough to buy them will steer off mandarins for some time to come. This variety should not be gathered till thoroughly ripe, as when marketed in an immature state it spoils the market, as it puts people off eating citrus fruit.

Clean up the orchard after the summer rains, and have everything ready for the marketing of the crop. See that there is a good supply of clean, dry case timber on hand, as one of the greatest sources of loss in shipment is packing fruit in green cases.

Strawberry planting can be done throughout the month. Plant such berries as Federation on the lowest ground, and Aurie, Anetta, Trollop's Victoria, and Glenfield Beauty on warm, well-drained soils. Prepare the land thoroughly, so that it is in perfect tilth, and in a fit state to retain moisture well; as on this, as much as anything, the success of the crop depends. Where new orchards are to be planted, get the land ready—not the clearing, which should have been done months ago, but the working of the land, as it is advisable to get it thoroughly sweetened before putting the trees in.

## THE TROPICAL COAST DISTRICTS.

The Notes for February apply equally to March. See that bananas are netted—keep down weed growth, and market any sound citrus fruits. Clean up the orchards as well as possible, and keep pines clean. Get land ready where new orchards are to be set out, as tree-planting can be done during April and May. Pines and bananas can still be planted, as they will become well established before winter.

## THE SOUTHERN AND CENTRAL TABLELANDS.

Finish the gathering of the later varieties of deciduous fruits, as well as grapes. Clean up the orchard, and get ready for winter. Get new land ready for planting; and where there are old, dead, or useless trees to be removed, dig them out and leave the ground to sweeten, so that when a new tree is planted to replace them the ground will be in good order.

In the drier parts, where citrus trees are grown, keep the land well worked, and water where necessary.

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# Agriculture.

## WINTER CEREALS.

### EXPERIMENTS AT ROMA STATE FARM. SEASON 1916.

Before giving the results of the different experiments a brief resumé of the meteorological conditions experienced immediately preceding the sowing and during the growing period of the crops will be given.

At the time of sowing (May) the prospects were very little, if any, brighter than at the same time in 1915, there being practically a complete absence of moisture in the soil and subsoil. The reason why this was so can be readily understood when it is learned that the rainfall for the twelve months ended 31st May was 863 points, representing forty-seven falls, of which quantity only 567 points fell after the removal of the previous crop. Had the latter amount been experienced in one or two falls it would have been of some value, but it represents the total of thirty-seven, the heaviest of which yielded 49 points, so very little benefit accrued therefrom, more especially as it was recorded during a period when the evaporation was at its greatest pitch. With the advent of June, relief came, as a welcome change took place during the first week, 65 points of rain being recorded, which in itself was sufficient to promote the germination of all the grain sown. The weather continued showery, and by the end of the month the total precipitation reached 307. July saw a continuance of the congenial conditions, 275 points being registered. August also may be considered favourable, 1½ in. of rain falling. Such conditions resulted in exceptionally heavy growth being made. September saw a curtailment in the precipitation, with the result that the heavy

call on the moisture contents of the soil, made by the exceptionally heavy growth, had such an effect as to reduce it so that it was insufficient to meet the full requirements of the crops, which resulted in a reduction of the ultimate yield by a pinching of the grain. Possibly the injury occasioned by the reduction in the moisture supply was much less than the benefit it conferred in checking the visitation of rust, which first made its appearance about the middle of August, and which gave every indication of being very virulent. The cold snap experienced in the latter part of that month was also very serviceable in checking its career, although it resulted in the frosting of wheat in some localities. The middle of October, when most of the early varieties were beyond benefiting from rain, showery weather set in, continuing throughout the balance of that month and the next, with the result that harvesting operations were delayed, quality of grain depreciated, and a goodly portion of the crops rendered worthless.

The following is a tabulated list of the rainfall for the thirteen months ended November, 1916:—

| Month. | Wet Days. | Points. |
|---|---|---|
| November (1915) | 4 | 55 |
| December (1915) | 6 | 91 |
| January (1916) | 6 | 55 |
| February „ | 6 | 140 |
| March „ | 3 | 161 |
| April „ | 7 | 65 |
| May „ | 0 | 0 |
| June „ | 9 | 307 |
| July „ | 7 | 275 |
| August „ | 6 | 151 |
| September „ | 3 | 77 |
| October „ | 6 | 190 |
| November „ | 8 | 684 |

## MANURIAL EXPERIMENTS.

On these blocks, each of which contains one-quarter of an acre, the experiments have been carried out continuously. In 1915 the crops were practically a failure; nevertheless the returns are included in the averages given.

It will be seen that superphosphate at 1 cwt. per acre is the only manure which gave a slightly better financial return than the unmanured blocks.

The preparation of the seed-bed necessitated two cultivations with disc cultivator and two harrowings prior to seeding. Ploughing was not necessary, as practically no consolidation of the soil had taken place since the last was done.

Sown, May; variety, Bunge No. 1; quantity seed, 2½ pecks (1914 grain), treated with 2 per cent. solution bluestone as a smut preventative; germinated, 6th to 8th June; earing, first week September; ripe, third week October; harvested, last week October.

| Block. | Manure Applied. | Cost. £ s. d. | Yield. | Average. Seven Years. | Remarks. |
|---|---|---|---|---|---|
| 1 | Shirley's No. 1 Cereal Manure, 1 cwt. .. | 0 11 0 | 29·5 | 20·4 | Crop thin; stout straw; free from rust; ears well filled. Through the proximity of obstacles it was necessary to turn over on this block with harrows, which resulted in the destruction of a goodly portion, thereby interfering with results. |
| 2 | Shirley's No. 1 Cereal Manure, 1 cwt. per acre; ½ cwt. nitrate lime | 0 17 9 | 29·2 | 21·6 | Crop medium; thin straw; fairly tall; heads large and well filled; traces rust; grain slightly pinched. |
| 3 | Shirley's No. 1 Cereal Manure, ½ cwt. per acre; ½ cwt. nitrate lime | 0 12 3 | 29·8 | 22·6 | Remarks as applied to No. 2. |
| 4 | Control (unmanured) .. .. .. .. | .. | 30·1 | 18·7 | Crop medium; thin, even straw; medium length; fine heads, well filled, and slight traces rust; very little flag; grain slightly pinched. |
| 5 | 1 cwt. superphosphate .. .. .. | 0 7 0 | 31·2 | 21·0 | Crop even, medium length; very little flag; straw fairly fine; slight traces rust. |
| 6 | Thomas's Phosphate .. .. .. .. | 0 5 6 | 30·4 | 19·4 | Crop slightly uneven; unequal ripening; more flag than Nos. 4 and 5; traces rust; grain slightly pinched. |
| 7 | Stable manure; superphosphate, ½ cwt. .. | 0 3 6 | 24·9 | 19·6 | No manure (stable) applied. Crop grew too flaggy; stooled very well; straw short; crop on the whole badly affected by dry weather and rust. As in the previous season the ears were badly tipped and failed to emerge from the shot blade. |
| 8 | Superphosphate, 1 cwt.; nitrate of lime, ½ cwt. | 0 13 9 | 28·4 | 19·2 | Earing uneven; crop on the whole uneven, due to inequalities in the soil. Patches where crop grew flaggy produced pinched grain, possibly due to dry weather and effects of rust. |
| 9 | Nitrate of lime, ½ cwt.; superphosphate, 1 cwt.; sulphate of potash | 1 1 9 | 29 ·5 | 17·9 | Remarks as applied to No. 8. |
| 10 | Superphosphate, 1 cwt.; sulphate of potash, ½ cwt. | 0 15 0 | 30·6 | 19·7 | This experiment should have included dried blood, but it was unprocurable. Crop uneven, but more even than in any previous season. Where crop was flaggy it suffered from dry spell and produced pinched grain; traces rust. |
| 11 | Unmanured .. .. .. .. .. | .. | 28·9 | 18·4 | Crop uneven, but inequalities not so marked as usual. Straw medium length; medium stout; traces rust. |
| 12 | Thomas's Phosphate, 1 cwt.; sulphate of potash, ½ cwt. .. | 0 14 6 | 29·8 | 20·4 | Crop uneven, ranging in height from 3 ft. to 5 ft.; fairly flaggy; inclined to be rusty; grain slightly pinched. Blood should have been included in this experiment. |
| 13 | Sulphate of potash, ½ cwt.; superphosphate, 1 cwt.; nitrate of lime, ½ cwt. | 1 1 9 | 30·6 | 20·6 | Remarks as applied to No. 12. |

## MAIZE CROP PROSPECTS IN THE BOONAH DISTRICT.

In a report dated 5th February, submitted by Mr. W. H. Bechtel, Field Assistant, in reference to his recent visit to the Boonah district, attention is drawn to the fact that the August, September, and October sown maize crops made very satisfactory progress, and give excellent promise of bountiful returns of grain; a number have been harvested, but a spell of bright, sunny weather, to admit of handling the main crops, is now required. It is noteworthy that late-sown crops are not doing at all well, and fully 75 per cent. of these are backward and stunted owing to the presence of what is locally termed "blight." Speciments of affected plants have been submitted to the Government Pathologist (Mr. Henry Tryon). From present appearances many of these late-sown crops will be a complete failure. Others may possibly set a small proportion of grain, but the position at this stage is not at all satisfactory. Mr. Henry Tryon's remarks on the subject of the affected crops are as follows:—

"Maize.—Disease affecting late-sown (December-January) crops in the Boonah district: This malady is one that does not appear to have come under the notice of previous workers. It is termed by me—in earlier reports—'Maize Hyperplasia.' It is a disease affecting particular cells of the leaf-tissue; these becoming exceedingly enlarged, without any great numerical increase, the energy of growth being diverted for their formation instead of being utilised for increase in size, &c.; hence the linear series of little swellings (intumescences) in the foliage. This trouble, I have been led to conclude, is physiological and non-parasitic. Therefore I have found it to occur in a particular period in the plant's growth when abundant rainfall is experienced, water-logging the soil; and in such a way as to suggest that it has a meteorological origin. Its prevention, therefore, is a matter involving proper agricultural method."

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## THE IMPORTANCE OF SOIL VENTILATION.

A very instructive article on this subject appeared in the "Agricultural News," Barbados, of 2nd December, 1916. The writer points out that when considering the composition and structure of a fertile soil, we are apt to overlook the fact that air is a constituent part just as essential as water or plant nutrients. Air supply has never taken definite shape in soil science to the extent water supply or plant-food has, and consequently an important field of investigation appears to lie practically untouched. It is true that drainage in relation to soil ventilation is appreciated, as well as methods of cultivation that go to produce a good tilth, but that does not teach us anything; it gives us no definite clue as to what the roots of different crops require, or whether air supply might not be more scientifically adjusted to suit the roots of different crops, and the beneficial bacteria that function under similar conditions in the soil. If, under certain circumstances, it were found desirable, it should be quite practicable to supply the soil with air by more direct means than by cultivation and drainage, just as we know it is practicable to supply the soil with plant-food in the form of chemicals instead of relying upon weathering and the decay of organic matter.

Then considerations suggest a new aspect of land culture, namely, constructive soil ventilation—a definite branch of agricultural engineering associated with drainage.

[In 1908 a Bundaberg sugar-planter spent a great deal of money in draining a large sugar-cane field, and after the work was done, no rain came, and neighbouring planters laughed, for no water came through these drains, and they said he had wasted his money. But, as the cane grew, it was noticed that during all the dry weather that season, when everybody's cane was drooping, and scarcely growing at all, the cane on this drained land kept on growing, and the canes held up their light-green heads, above all other canes in the district, and the crop was nearly double that on the other plantations, although there had been no rain and not a drop of water ran through the drains. The reason was that the moisture from below rose through the warm, well-aired loose soil, and the cane roots went down to meet it, and so they stood the dry weather and grew quickly.—Editor, "Q.A.J."]

Before proceeding to enlarge upon this idea, it will be well to consider what evidence exists to justify it.

The importance of soil ventilation has been brought out prominently by the observations of Howard in India. He has pointed out that crops undoubtedly differ greatly in the amount of air their roots require. In India, for example, Gram requires a great deal of air, and only a moderate amount of water. In some parts of the country, the conditions, both natural and artificial, are such that the roots get plenty of air. Here this particular crop thrives, but in other places, where, for instance, irrigation conditions obtain, Gram will not grow successfully. Howard maintains that the proper provision of air to the soil is all that is necessary for extending the cultivation of this useful crop. The facts are the same in regard to the cultivation of Indigo. This crop is largely cultivated on the higher levels in rice-growing districts. The occasional flooding of these higher levels due to the rise of the rivers is the cause of the low yields obtained in India compared with those obtained under drier conditions in Java.

The two crops just referred to are of course leguminous, and the detrimental effect of insufficient air is partly due to the limited supply of nitrogen available for fixation by the nodules on the roots. But that is only partly the reason; bad aeration has a general retarding influence upon root development. Howard has noticed this even in the case of wheat, which is a crop that can be successfully grown on very heavy land. Experiments conducted at Pusa show that the best-grown wheat can be raised only on soil that is well aerated. Lastly, rice which grows in swamps is unable to thrive without a supply of oxygen for root development. This is obtained through the surface film of algae and other green organisms on these soils. Certain cultural operations after harvest also help to conserve a store of oxygen in the soil subsequent to the arrival of the rains.

Other crops in other parts of the world are equally susceptible to anaerobic conditions in the soil. In regard to cotton, we know that this plant thrives best on soils of open texture, and that the principal cause of boll-shedding is root asphyxiation, proved by Balls, in Egypt, and

fully supported by observations in the West Indies. Cacao is extremely sensitive to clay. That may be because cacao is naturally a deep-rooting plant and the clay offers mechanical resistence to the extension of the roots; but it is also likely to be due to the fact that a clay soil contains less air than a light soil. It is not merely a clay subsoil, but a clayey surface soil that has an adverse effect on the growth of cacao.

Coconut trees are very sensitive to inadequate aeration. They will thrive only on land that is well drained either naturally or artificially. No harmful effect is produced on the roots by the presence of water; coconuts will thrive in saturated soil provided the water is continually moving. This is a very significant fact concerning the physiological importance of soil aeration.

In view of all these facts, which come within the range of observation of the planter himself, it will be admitted that soil aeration demands greater attention than it has received. The significant fact is, that air is the limiting factor to the efficiency of water supply. Beyond a certain point, water is wasted in the soil if it is not aerated.

Turning more particularly to the physiology of roots, it is very desirable to know more concerning their respiration. Respiration has been studied almost exclusively in regard to the parts of the plant above ground, and the generalisations have been extended to apply to the roots. But it does not seem justifiable to assume that the manner in which roots breathe under the complex conditions, both chemical and physical, of soil environment is the same, and follows the same laws as those parts of the plants exposed to the comparatively simple environment of the atmosphere. There is probably a difference in the rate of respiration of the roots of certain plants, and, as already suggested in this article, the growth of certain crops might be stimulated by the artifical introduction of air into the soil.

Constructive soil ventilation as an established branch of agricultural engineering presupposes successful researches into the air requirements of roots and soil organisms. The desirable conditions in different cases having been determined, it should then be possible to establish them.

The methods of effecting soil aeration artificially would come within the province of the engineer. Possibly one method would be to lay down porous ventilation-pipes through which air could be introduced, if necessary, under pressure. In orchard cultivation vertical tubes might be introduced near the trees and air pumped down them periodically. In the light of soil aeration better use might be made of soil explosions with dynamite, to aerate clayey subsoils especially.

Investigation might show that an alteration in the percentage composition of the soil atmosphere would prove advantageous in some circumstances; for example, a high proportion of oxygen might prove beneficial, or in some cases the removal of an excess of carbon dioxide. There is also the question of the possible value of introducing gases other than those that normally constitute the air of the soil. A matter for speculation is whether liquid air could be usefully employed as a soil fertiliser.

Finally, more might be done to bring about a better state of aeration in certain circumstances by means of methods of cultivation. The forking of orchard soils is still a matter of some controversy, and the true value of this operation requires investigation. The ploughing of the soil in coconut plantations gives good results, but its relation to soil aeration is not generally recognised.

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## "WOOL COTTON."

"Cotton and Cotton Oil News," U.S.A., says:—"A. G. Spiller, a farmer living near Barnesville, Georgia, has grown about 150 lb. of seed cotton this year of what he calls 'Wool Cotton.' He has been displaying the cotton, and it has attracted considerable attention. It has a remarkable similarity to wool. The locks are 4 or 5 in. long, and the yield is said to be heavy on the stalk and in lint. Mr. Spiller asserts that it is boll-weevil proof on account of the toughness of the hull or burr of the boll. All who have examined the cotton agree that it is very unusual, and its development will be watched with interest."

Mr. D. Jones informs us that some Northern and Central Queensland varieties of Mascot types have locks exceeding in length that described, and in all probability a superior class of fibre, and are virtually immune from insect pests. Cotton similar to that described grows "volunteer" all over the North.—Ed., "Q.A.J."

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## NEW METHOD OF POTATO CULTURE.

In the latest issue to hand of the "International Review of the Science and Practice of Agriculture" (Rome), there is given a summary of an article by a well-known French authority, in which a new method of economic cultivation of the potato is described. This consists in planting budding stalks instead of tubers, and has been tried for several years with good results. The tubers are sorted out and spread in a dry cellar at a temperature above 63 degrees Fahr. if possible. In a few days, before the tubers wrinkle, rooting sprouts are obtained, which must be cut before they reach a length of 8 in. After cutting, they must be planted as quick as possible. The sprouts are planted in twos on ridge sides at distances of 8 by 20 in. at a depth of 2¾ to 3½ in., according to the soil. In a few days the outside part becomes green and puts out one or two stalks, the roots taking hold at the same time. Each planted shoot gives one or two tubers which are seldom very large, but never small; a crop of nearly 8½ tons per acre of marketable potatoes may be reckoned on. The method is applicable to all loose, light, and relatively dry soils. Its advantage is that it leaves for consumption those potatoes which, on the ordinary method, would have been used for planting. The shoots given off by the potatoes on germinating, keep for several days, and can be planted direct, or even forwarded some distance for planting.—"Farmers' Advocate," South Africa.

# MARKET GARDENING.

## SUGGESTIONS FOR SEED PRESERVATION.

In a Bulletin (No. 20) of the Porto Rico Agricultural Experiment Station, U.S.A., on experiments on the supposed deterioration of varieties of vegetables in Porto Rico, by Messrs. C. F. Kinman, Horticulturist, and T. B. McClelland, Assistant Horticulturist, the following remarks on preserving the vitality of vegetable seed are worthy of notice by both vegetable and flower gardeners:—

"The humidity of the air in Porto Rico is very high, and causes vegetable seed exposed to the open air to lose their viability much sooner than would be the case in a drier atmosphere. The inability to keep seed in good condition is a serious hindrance to vegetable growing. When the experiments herein reported were undertaken, the following method for preserving seed was employed and was very satisfactory. The seed in cotton sacks was placed in airtight glass jars in the bottom of which a few ounces of calcium chloride had been placed. A small piece of wire screening separated the seed from the calcium chloride below. This method is simple and costs little, and is recommended for general use. While glass jars were used in experiments, metal or non-porous earthen vessels will serve as well if made airtight. It must be remembered that the calcium chloride placed in the bottom of the jar is used as a drying agent and not as a preservative in any other sense. Seed such as coffee and citrus, which lose their viability on drying, can not be kept viable in this way. If seed with a fairly high water content is to be stored, it may be necessary to renew the calcium chlorid, since, unless a sufficient quantity of calcium chloride is used to take up the surplus water, the seed may not be kept sufficiently dry. Before the calcium chloride becomes entirely moist, it should be replaced by a fresh supply. In handling it should be exposed as short a time as possible to the open air, since it takes up moisture from the air readily and so loses its drying power. In removing seed from the container this should be remembered.

"In the last germination test of bean seed which had been kept in the open the seed was put in the tester on the 29th October, 1910, germinating 4 per cent. On this date, 100 per cent. of the seed kept in the drier germinated. This seed from the drier still showed a 100 per cent. germination nearly two years later, 13th August, 1912, when the tests had to be discontinued on account of a scarcity of seed.

"By the end of 1911 all of the imported seed kept in the open air had lost its viability. In 1915, 94 per cent. of the radish seed and 84 per cent. of the beet and tomato seed kept in the drier still germinated.

"The native tomato seed, after more than five years in the drier, showed a germination of 93 per cent., whereas seed kept in the open lost all viability in less than half that time.

[The loss of viability of imported seed of a number of different vegetables is graphically shown in illustrations which are not here reproduced.—Ed., " Q.A.J."]

"The very rapid loss of viability of lettuce seed kept in the open air stands in marked contrast with the results of tests of seed of the same

lot which had been kept in the drier and which showed a germination of 90 per cent. in 1915.

"That Northern vegetables degenerate quickly when taken to the Tropics is a common belief in Porto Rico, resulting from the fact that seed loses its viability quickly when exposed to moist air and from a lack of knowledge regarding seasonal effect on vegetable production.

"To retain the viability of seed of the crops used in the experiments here reported, the seed was stored in airtight jars in the bottom of which was placed a small quantity of calcium chloride. This method was so satisfactory that it is recommended for general use."

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## TOMATO-GROWING.

By WM. McLEAN, Boggabri, New South Wales.

A large number of people from Queensland keep writing to me *re* growing tomatoes. As I know that many of them are readers of your paper, I give them a little information as to the methods adopted by me in growing of same. One thing I notice in articles on tomato-growing is, that all vines are recommended for the same treatment in cultivation. This, I find in many cases, is a mistake. I wish to point out that some varieties make very little vine and can be allowed to trail on the ground with satisfactory results, while others that are strong growers and require to be let grow tall so as to bear heavy crops of fruit, must be trained up or staked to get good results. I always stake the following, and let them run 6 ft. to 8 ft. high, and often more:—Ferris Wheel, Giant Tree, Yellow Ponderosa, and Colossal. These kinds must be trained up or staked to get good results, as the fruit is so large that the limbs will get broken, and most of the largest fruit will be on the ground, on half broken limbs, the large fruit making it impossible for the limbs to bear them up, and, unless trained up, staked, or given support, good results cannot be expected.

The Ferris Wheel, Giant Tree, Colossal, and Yellow Ponderosa are the largest I have ever imported, while the Yellow Ponderosa is the smallest of the four, but a very strong grower and a heavy cropper, and a splendid shipper. The fruits will keep in good condition on this variety longer than any other variety I have ever grown, and run very even in size. I have about sixty different kinds on trial this season, collected from India, South Africa, New Zealand, and different States of America, while I am trying also a number of our leading varieties to see how they correspond with the new imported ones. By keeping the vines of all large kinds staked or tied up, the yield is much better. It keeps away grubs, and prevents rot, if very wet, and in a hot climate, like where I live, prevents sunscald. I have had a few very hot days this summer, with the thermometer from 100 to 110 degrees in the shade. Many tomatoes on the vines that were allowed to trail on the ground got sunscald, while not a single one was touched on the staked vines. I don't care for the single-stem system in my climate, as it is too hot. I let my vines throw out a number of shoots, so that they may grow

into a large bush, as it keeps the fruit well shaded in the hot weather. I also draw the earth well up to them, when the plants are about 8 in. high, or a little less, and then do the same again when the plants are starting to shoot out suckers. I have about 3,000 vines growing this season.

The following do better if staked or trained up if convenient:—Burpee's Improved, Matchless, Snowball, Golden Sunrise, Wood's Imperial Beauty, Five Million Dollar, John Bair, and Bonnie Best (South African strain). I wish to mention that the Snowball is a white tomato, but may vary, in different soils and under different climatic conditions, towards yellow or straw colour, but all the same, if it does, it is large and a beautiful tomato. This tomato makes very little vine with me, but bears very large fruits, and unless the vines are staked or trained up a great number of the main limbs will get broken off, and half the fruit are destroyed.

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## SOME FINE TOMATOES.

During the past two or three months, the fruits and vegetables in various parts of Queensland have excelled in size and weight anything which has, except in rare instances, been in evidence in former seasons. Within the last three months we have seen peaches weighing 1 lb. each, onions 2 lb., bananas 9 in. long and 5 in. in circumference, and in the



PLATE 6.—SOME FINE TOMATOES.

middle of February, a banana-grower is reported to have produced bananas, each fruit weighing 1 lb. Now we have a specimen of tomatoes grown by Messrs. C. Tutton and Sons at Cloncurry, photographed by Mrs. Chas. Tutton. The photograph shows five tomatoes, the combined weight of which was 11 lb. 4 oz. It would be of interest to know if any particular methods of manuring, pruning, &c., were employed in producing this magnificent fruit, which, from the photograph, might easily be mistaken for table pumpkins.

# NEGLECTED INDUSTRIES.

## PEANUTS.

Notwithstanding all that has been written in this and hundreds of other agricultural journals throughout the civilised world on the great value of peanuts both as a food for stock and for the production of oil, few farmers have, in this State, devoted any attention to it as a farm crop. In Hawaii, the United States, Japan, Russia, China, and other countries, peanuts are grown largely as a staple crop. They are consumed in large quantities by the inhabitants of those countries both in a raw and roasted state. In the Southern States of the Commonwealth the crop is produced in fairly large quantities with considerable profit to the growers. A farmer in Victoria, Mr. Bunbury, of Ballendella, known as the "Peanut King," estimates that as much as £350 per acre profit may be earned by growing peanuts. The wholesale price of these nuts, he said, was 6½d.* per lb., and, despite importations from Japan, the demands of the Australian markets are not properly filled. He stated that when he marketed his first crop in 1914, he disposed of a large portion of it at 1s. per lb., and it was his opinion that, even if nuts were to fall to 1d. per lb., a grower could make a profit of £27 per acre.

The total area of land under cultivation in Queensland amounted in 1915-1916 to 1,059,401 acres besides 329,813 acres in fallow, or lying idle. Out of that area only 102 acres are returned as being under peanuts. which yielded 85,864 lb. of nuts—12,980 lb. in the Moreton district, 27,219 lb. in the York Peninsula, and 41,700 lb. in the Port Curtis district. The money value of these crops at 6d. per lb. would be about £2,146. An

* The price of peanuts at present, in Queensland, is about 3d. per lb., and although 6½d. per lb. was obtained by the Victorian farmer, the Queensland farmer would have to pay freight and other charges to Sydney or Melbourne, which would reduce the net return to the grower. At the same time, where he now sells 1 cwt. he would dispose of tons in the Southern markets, provided he can produce an even, bright-coloured, clean sample, such as can always be turned out from a light, sandy loam.—Ed., " Q.A.J."

acre of peanuts will yield from 1,500 to 2,000 lb. of nuts. At one of the Queensland State Farms, the return per acre in 1914 was 2,420 lb.—£60 worth at 6d. per lb.

Six years ago there were in the United States of America, as in Queensland to-day, only a few experimental plots in one county. The estimated area in that county in 1914 was 15,000 acres and other counties have followed suit. The major portion of the crop is devoted to pig-feeding and oil-making. For the former purpose the peanut is far preferable to corn, when fed in conjunction with other foods, in promoting rapid growth and considerably increased weight as compared with results from other food. Professor Cottrell (a pig-raiser in Texas, U.S.A.) has shown that it requires less than 3 lb. of peanuts for each 1 lb. of gain on pigs that weighed from 40 to 50 lb. at the start. At Arkansas Experiment Station, an acre of ripe peanuts pastured by hogs made 1,252 lb. of gain, while an adjoining cornfield, yielding 30 bushels to the acre, only made 436 lb. of gain per acre on hogs. Now we have been asked, "Where is there a market for large quantities of peanuts?"

We have just received a letter from Messrs. A. H. Burnet and Co., Limited, merchants and wholesale grocers, Australia House, Sydney, N.S.W., which answers the question. This firm writes: "There is a very fair market in this State for peanuts, and large quantities are bought, especially by the Chinese merchants who import them from the East. We would give the whole of our trade to the Australian producers if they will market them in a satisfactory way." The firm also states that if any growers are willing to grow with the idea of marketing in New South Wales, they will see other members of the Merchants' Association there with a view of giving the growers an idea of the quantity the association would be prepared to take. Prospective growers would naturally ask what price the New South Wales merchants would be prepared to pay for nuts, but the firm did not name any price. In any case, the question of freight from Queensland to New South Wales would have to be considered.

## NEW USE FOR COCONUT WATER.

Coconut water or, as some call it, "milk," which hitherto has been a waste product in copra-making countries, has been found to be an excellent rubber coagulent. The discovery has been lately made in Ceylon. Millions of gallons of coconut water allowed to run to waste on coconut plantations can now be made use of at a good profit. The coconut water is allowed to ferment for four or five days, after which it can be used without further delay as coagulating latex. This is said to produce a fine rubber, superior to that procured with the use of crude acetic acid. The colour of the rubber with acetic acid fermentation is decidedly inferior to the coconut water fermentation. Coconut water is now made up in bulk and shipped in large quantities from coconut plantations to the various rubber estates.—"Town and Country."

# Pastoral.

## THE BLOW-FLY PEST.

By W. G. BROWN, Instructor in Sheep and Wool.

About one of the best suggestions which has come before me lately in regard to the tratment of sheep as against the blow-fly, is made by Mr. P. O'Sullivan, of Charleville.

In the "Courier" of the 16th February, that gentleman states (*inter alia*)—

"  . . . . There is an old saying that 'Cleanliness is next to godliness.' The proverb might apply in this case. If the sheep on all stations were washed, say, in the beginning of the summer months—as was the case some forty years ago—it might relieve the trouble. The process was as follows:—First, the sheep were put through a hot water soak tank for about twenty minutes, then they were run through a race, and placed under cold water spouts, being afterwards allowed to swim through another square tank to a drying trellis pen, thus cleansing the dirt and grease out of the wool. The fly was never known to attack the sheep treated in this way. With the advantages of bore water the wool could be made very clean and bright. On Tarong Station, in the Burnett district, in olden times, when that magnificent property carried a good flock of sheep, a woolwash was in existence there, and was erected on the principle I refer to. Some eight horses were driven in a circular 'merry-go-round' whim, which worked machinery that operated eight to ten spouts, from which the water would gush in a goodly stream at a terrific pace. Men would stand up to their waist in the water, holding each animal sufficiently long to scour the fleece, then let the sheep go, and it would swim to the drying pen, wearing a beautifully clean, white appearance. This, I think, would be almost a sure safeguard against the invasion and vicious attack of the fly. Of course, the plan I state could be worked now on a more modern, up-to-date, and scientific system; for instance, it might not be necessary for the men who would be operating to stand in the water. Some appliance could surely be devised to do that work."

Now, there is more than a grain of common sense in Mr. O'Sullivan's suggestion. It is well known that, generally speaking, light, dry-woolled sheep and crossbreds are not nearly so subject to the attention of the fly as the dense-woolled, greasy wools of the latter-day merino. In the departmental experiments of 1914-15 the sheep dipped showed a greater relative immunity than the undipped, the non-poisonous dips themselves showing out fairly well in the analysis. I am of opinion that the cleansing effects of the dipping itself had more than a little to do with the results at the end of the twelve months' trial. Not only was there

a big difference (53·17 struck of the undipped, and 18·72 of the dipped), but the wool, when sold by Messrs. Fenwick and Co., in the open market, and classed only as dipped and undipped wool, showed a balance in favour of dipped wool of 3d. per lb. (*vide* "Queensland Agricultural Journal" of January, 1915). The dipping was done by means of a Tandawanna shower, which is established at Gindie State Farm. It is calculated that the amount of dip solution falling from a height of about 7 ft. for the six or seven minutes the sheep were under the shower, was equal to a fall of 10 in. of rain over the area of the pen holding the animals. Thus the sheep received a great washing—not as cleansing a washing as hot water and soap would give, but still fairly effective. For the ten months after the dipping, the undipped sheep could be distinguished without handling, merely by the difference in the tips of the fleece, one being much cleaner and brighter than the other. With bore water the process of washing the sheep by means of the shower would be comparatively cheap and easy. The sheep would not be knocked about; and, if soap and water were desired, there would be little waste, as the liquor could be used almost *ad lib.* in regard to time during which it was flowing. As is well known to scourers, the greater the number of fleeces washed in the first liquor, the better the liquor becomes for cleansing purposes.

The matter will certainly be tried out in the experiments about to be conducted at Gindie, and I have to thank Mr. O'Sullivan for the suggestion which, I confess, should have been obvious to everybody concerned. The gain, besides, would be enormous in a dozen ways which are known to wool and sheep men.

## LIVE STOCK IN THE UNITED STATES OF AMERICA.

Official figures state that there are, in the United States of America, 21,262,000 milch cows, 37,067,000 beef cattle, 49,956,000 sheep, 64,618,000 pigs, and 21,195,000 horses.

## A NEW METHOD OF BRANDING.

An original and admirable idea in branding has been placed upon the market by Mr. James Robinson, the well-known maker of ear-tags and ear-punchers. The object is to brand on the inside of the ear, thereby obviating the destruction of the hide which accompanies the usual system of branding. Branding on the horn has been tried as a means of obviating the drawback of the usual system, but this has been found to come out in a year or two. Tags have been introduced from the United States, but these, too, often tear out, while tattooing grows indistinct. Several pedigree cattle breeders who have tried Mr. Robinson's system are thoroughly satisfied with it. It certainly meets a long-felt want.—"New Zealand Farmer."

# The Horse.

## TREATMENT OF SMALL WORMS IN HORSES.

The Chief Inspector of Stock and Chief Government Veterinary Surgeon, Department of Agriculture and Stock, Mr. A. H. Cory, M.R.C.V.S., advises —

*Sclerostoma tetracanthum.*—This is a small thread-like worm about ½ in. long, found chiefly in the large bowel in great numbers. The embryos encyst themselves beneath the mucous membrane. The countless wounds which the worms make in the bowel and the irritation caused by the encysted larvæ give rise to enteritis, &c. There is usually associated with this worm another known as the *Sclerostoma equinum.* This worm is about 1¼ in. to 1½ in. long, grey or reddish-grey in colour, with a round knobbish head, and tapering to the tail end. The embryos wander into the blood-vessels, causing obstructions, giving rise to grave complications.

Treatment.—All suspected animals should be purged by administering a dose of physic such as 5 to 6 drachms of powdered Barbados aloes, with 1 drachm of powdered ginger given as a drench in a pint of thin gruel, or made into a ball with a little soft soap. After the action of the purgative has ceased, they should be given every day, about one hour before their morning feed, the following powder mixed in a couple of handfuls of damped food:—Antimony tartrate, 2 drachms; powdered sulphate of iron, 1 drachm; powdered gentian, 2 drachms; powdered aniseed, 3 drachms.

After six doses they should be given a second active purgative; for the smaller horses and ponies not more than 5 drachms of aloes, and 1 drachm antimony tartrate should be given. During the treatment the animals should be kept yarded to prevent the contamination of pastures by excreta, which should be gathered up and burnt and the ground dressed with common salt or quicklime. As infested animals cannot by one course of vermifuges be divested of the larvæ in the cysts and blood-vessels, they should be treated at intervals of two or three months. More important than medication is the exclusion of embryos from food and water.

Wherever the *Sclerostoma* have secured a local habitat the land should be put under a rotation of crops to be laid down in grass again after four or five years; the *Sclerostoma* ova will by this time have hatched out and died a natural death. Where this is impracticable change the horses to other pastures and depasture the infested land for several years by cattle or sheep which do not harbour the *Sclerostoma*; in all cases it must be provided that no drainage can come from infested pastures to the clean pastures. Rock salt left in the paddocks for the horses to lick will greatly minimise the chances of infestation.

[NOTE.—A correspondent informs us that he tried feeding some horses infected with worms on sunflower leaves, with the result that in three weeks the animals were entirely free of worms.—Ed., " Q.A.J."]

# The Orchard.

## THE CINCTURING OR RINGING AND GIRDLING OF FRUIT TREES.

BY CHARLES ROSS, F.R.H.S., Instructor in Fruit Culture.

Some considerable attention has been given to this subject, which has been favourably commented upon from time to time, and a few remarks from myself in reply to many inquiries may not be inopportune.

The method has long been practised in all grapegrowing countries. The cincture consists of removing a narrow ring of the outer bark without injuring the inner fibrous tissue or cambium layer along which the sap rises to the superstructure of the tree. The return sap is thereby checked at the ring, and, instead of proceeding to the roots and causing more wood growth, it is elaborated in the blossoms, leaves, and fruit. The effect is to produce a more regular and better bearing habit, the fruit being earlier, larger, and richer in flavour and colour; and, what is also important, the fruit is not so liable to drop off after setting. The best time to ring or girdle is when the sap is in full flow, or when the petals are beginning to fall; if done later, the operation is useless for increasing the setting, but will ensure an earlier crop of better quality. I have advocated this system for many years, but until recently it has not been much followed. Where I have recommended it, and induced growers in the North Coast, Central, and Southern districts to try it, the result of the operation has proved all that has been claimed for it. A sharp knife may be used for removing the ring, but it can be done more quickly by the instruments figured in the illustrations (Figs. 19 and 21). Unfortunately this tool is now difficult to obtain, as it is of French manufacture.

In England, during my more youthful days, cincturing and girdling were performed on grape-vines grown under glass, and upon pears and other deciduous fruit-trees grown in the open, known to be shy croppers and late in maturing. Girdling with fine wire was even performed on hard-wooded, flower-bearing shrubs, such as roses and camelias, with more or less success for exhibition purposes; also to ensure a better setting of the seed heads after the flowers had been hybridised. In our own State there are many erratic and shy-bearing fruit-trees that will give a satisfactory response to the treatment, which has already been proved on mangoes, Washington Navel oranges, walnuts, peaches, pears, apples, grapes, &c. The method is well worth trying upon other fruits which have not yet been experimented with, more especially those varieties that are shy or erratic bearers; also

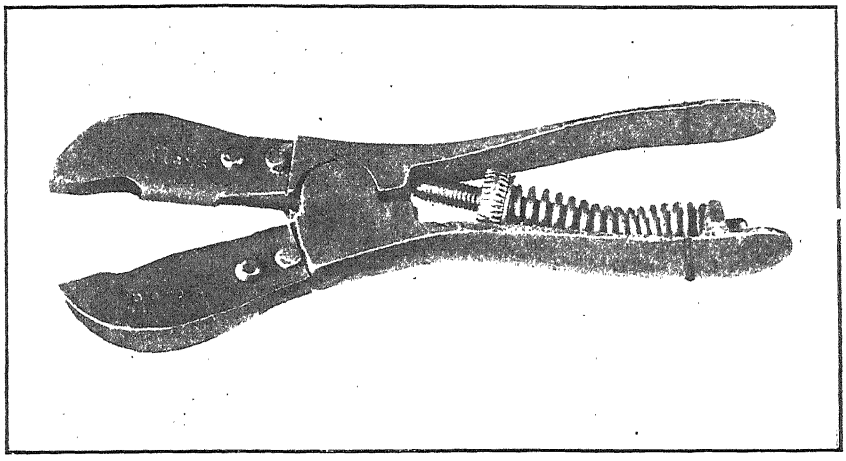


PLATE 7.—CINCTURING TOOL.

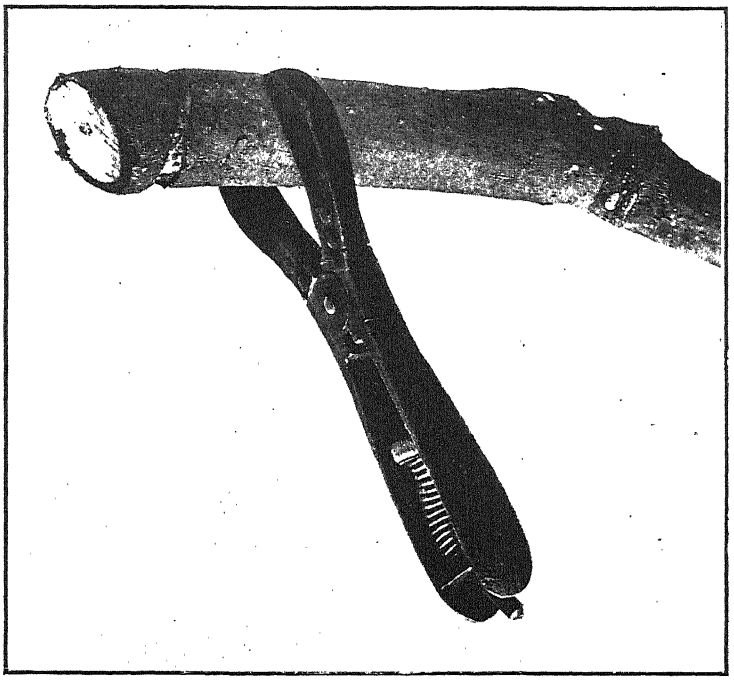


PLATE 8.—HOW TO USE THE INSTRUMENT.

such as, under ordinary conditions, require age before assuming a free cropping habit: for instance, the Ahuacate (Avocado or Alligator Pear), Pecan Nut, Cherimoya, &c.

Girdling is performed by twitching a piece of No. 8 or No. 10 wire very tightly round the trunk, or, say, half the main limbs or smaller branches; but if the stems are not perfectly cylindrical, the wire must be hammered in all round, otherwise the cavities would be bridged over by the wire, under which the sap would continue to circulate freely, and therefore would not answer the purpose. There must be a complete check of return sap all round the circle. The girdle is never so complete a check as the cincture. My European experience long ago was to select a number of limbs or branches (not all) on each tree or vine for the purpose, rather than ring the main stem, but the latter has been operated on here with the utmost satisfaction.

In this connection I desire to draw the attention of fruitgrowers to the following, which appeared in "The Fruit World" of last month (February):—

"RINGING FRUIT TREES.

"The practice of removing a complete ring of bark from fruit-trees has been followed by Mr. W. H. Hughes, of Longwood, writes Mr. Geo. Quinn, Horticultural Instructor, South Australia. Mr. Hughes practised the system on some trees of the Nickajack variety some ten years ago. He put two cuts, ⅛ in. apart, through the bark of the trees, and removed the strip between the cuts. The operation was performed when the blossom began to fall. It was important, Mr. Hughes considered, that the cuts should not be deeper than through the bark, and, if the weather were warm, he advised tying a strip of bagging over the wound to protect it from the rays of the sun. At the time the first test was made, one tree of a lot of eight was chosen for treatment. The treated tree yielded more fruit the season directly after treatment than was gathered from the remaining seven untreated. Needless to say, these were subjected to ringing the next year. All the treated trees are still bearing well. However, Dunn's Seedlings were also treated, but not successfully.

"Mr. J. Roebuck, also of Longwood, ringbarked a Gravenstein Apple in the limbs ten years ago. Prior to treatment it had not averaged a return of one case per year, but immediately succeeding the ringing it yielded thirteen cases, and since then has returned an average of nine cases annually.

"A vigorous growing Northern Spy Apple was ringbarked by Mr. W. Nicholls, and the result was very satisfactory."

The operation as performed in the present day may not have been known, but the principle of checking the flow of sap by bruising or beating the bark of trees must have been crudely understood hundreds of years ago (*vide* the following very ancient couplet):—

"A woman, a dog, and a walnut tree,
The better you beat them the better they be."

## PICKLING GREEN AND RIPE OLIVES.

Although olives have been grown for some years in different parts of Queensland, there has never been a systematic production of the pickled olive. At St. Helena Penal Establishment, in former years, very excellent olive oil was made, but owing, we believe, to the fruit-fly pest, oilmaking was given up. Some time ago we published in this Journal a very excellent paper on pickling olives, by W. Calton Grasby, and as olives are now ripening, we republish the directions for pickling both the green and ripe fruit, as possibly some owners of olive trees in bearing may like to make a trial of the process.

The directions for green olives are taken, with a few slight modifications, from a bulletin prepared by Frederick T. Bioletti, at the College of Agriculture, University of California, in 1901. They are the result of a series of experiments conducted at the Agricultural Experiment Station to determine the best method of preserving the green colour of the fruit, and at the same time give a good-quality pickled green olive.

### TO PICKLE GREEN OLIVES.

*Choice of Fruit.*—Only large-fruited varieties should be chosen, as the small green pickles bring a very inferior price. The olives should be gathered as soon as they have reached full size, and before they have coloured notably. A slight pink colour on one side does no harm, as it disappears during the process, but olives which have reached the stage of ripeness indicated by this first change of colour will probably have less of the bright green than if gathered earlier. No two varieties should be pickled together, and the olives should be graded into three or four sizes. The reason for this is that different varieties and different sizes are almost sure to require different strengths of lye solution, and it is therefore impossible to attain the best results unless this selection is made. The proper strength of lye solution to use in each case is best determined by a preliminary trial, as follows:—

*Preliminary Trial.*—Take a series, say four, of pint preserving jars, and fill them with the olives to be tested. Pour into them respectively a 1 per cent., 1½ per cent., 2 per cent., and 2½ per cent. lye solution, sufficient to cover the fruit. At the end of forty-eight hours examine them. (It has been found that a sufficiently strong lye solution will extract the acid and bitter principles of even very bitter olives in forty-eight hours.) At the end of this time some of the weaker lye solutions will be found to have neutralised—that is to say, all the lye will have been used in acting upon the acids of the fruit. This will be made evident by the lack of the slimy feeling which the fingers have when dipped into a lye solution and rubbed together. Suppose that the 1 per cent. and 1½ per cent. solutions are neutralised, and that the 2 per cent. still has a slight slimy feel, this will show that a 2 per cent. solution is a little stronger than is necessary to neutralise all the bitter or acrid matter in the sample tested. If, now, we use a 2 per cent. solution in curing the bulk of the olives from which the sample was taken, we are able to preserve the green colour perfectly. If we use a somewhat stronger

solution—say, a 2½ per cent.—the colour will bleach out a little; while, if we use a much weaker solution—say, a 1 per cent.—the green will change to that disagreeable grey or brown which we wish to avoid.

*Process.*—The appropriate strength of lye solution having been determined, the olives are placed in convenient receptacles, where they can be treated with a minimum exposure to light and air. For this purpose, 50-gallon barrels with very large bung-holes (4 or 5 in. in diameter) and spigots are useful. After filling the barrels with olives, the lye of the strength determined in the preliminary trial is poured in. Each barrel should be quite full of olives, and sufficient lye solution be put in to come flush with the bung-hole. At the end of forty-eight hours, the lye should be drawn off, the olives quickly washed in two changes of water, and the barrels filled immediately with a 2 per cent. salt solution. This brine should be replaced successively with a 4 per cent., 8 per cent., and, finally, a 12 per cent. solution, in the last of which the pickles remain permanently. The successive brines should be allowed to act for from forty-eight to seventy-two hours each, according to the size of the olives, the larger size requiring more time for the brine to penetrate and to displace the excess of lye which remains. The whole process will thus take from ten to fourteen days.

*Absence of Air.*—The essential part of the process is to avoid exposing the olives to the air during pickling, until all the bitterness and acid are completely neutralised by the lye. After this, the green colour seems to be fixed, and exposure to the air does not change it much, though it is well, all through the process, to avoid leaving the olives uncovered by liquid any longer than necessary.

As different varieties of olives, and even the same variety in different seasons and from different localities, differ very much in bitterness, the importance of treating each variety separately is evident, as each will require lye solutions of different strength to neutralise them. Very bitter olives—such as Mission, Sevillans, Manzanillo, and True Picholine—require solutions containing from 1½ to 2½ per cent. of pure potash lye, while olives containing little bitterness, such as Ascalan and Columbella, require only from ½ to 1 per cent. solutions.

To facilitate the preparation of lye solutions, it is convenient to remember that an English standard gallon of water weighs, approximately, 10 lb., so that to make a 1 per cent. solution of Greenbank's concentrated lye, use—1 lb. lye in 10 gallons water; ½ lb. lye in 5 gallons water; or ¼ lb. lye in 2½ gallons water. To make a 2 per cent. solution—1 lb. lye in 5 gallons water; ½ lb. lye in 2½ gallons water; or ¼ lb. lye in 5 quarts water.

Those who do not care to go to the trouble of the preliminary tests are advised to use a 2 per cent. solution of lye, and watch and taste the olives to see when the bitterness is removed. They may or may not get the best colour, but they will be able to make a pickled olive of excellent quality.

## TO PICKLE RIPE OLIVES.

The olives are best when fully ripe, but yet firm, and they should be picked carefully and not bruised. Olives of any degree of ripeness may be used, but all treated in one operation should be of the same degree of ripeness, of the one variety, and of uniform size.

Put the olives in 2 per cent. lye, and allow to stand twenty-four hours. Wash well for twenty-four hours, changing the water three or four times. If the bitterness has not gone, add 1 per cent. lye solution, and let stand for twenty-four hours; then draw off the lye, and replace with a 2 per cent. salt brine and again allow to stand twenty-four hours. Draw off this brine and replace it with another of the same strength. After forty-eight hours again change for fresh brine, and test for bitterness. If this has gone, use a 4 per cent. brine and allow it to remain four days, and then change the brine for fresh, of the same strength, for seven days. Then change for a 10 or 12 per cent. brine, and the olives will keep indefinitely, but may mould on top. To prevent this, either cover the contents of the vessels with a layer of olive oil, or, better still, pasteurise the vessels and the olives by treating them up to 180 degrees Fahr. for twenty minutes, sealing with pasteurised corks or stoppers.

## ANOTHER METHOD.

Place ripe olives in a jar or cask, and cover with a 1½ per cent. lye solution and 2 per cent. salt solution. Allow to stand for forty-eight hours. Draw off the lye and add 2 per cent. brine for forty-eight hours. Change the brine, still using 2 per cent., and allow to stand for three or four days; then repeat the operation, allowing to stand four days. Draw off the brine and cover with a 4 per cent. brine for a week; then change, and use an 8 per cent. brine for another week; then draw off the brine once more, and place the olives in jars or bottles with a 10 to 12 per cent. brine, and pasteurise.

## PRACTICAL HINTS.

For a small quantity of olives, procure a barrel-shaped earthenware jar, holding 5 gallons. Insert a spigot into the hole on the bottom side, and on the top let there be a circular hole about 3 in. in diameter. The spigot, of course, is for withdrawing the lye, water, and brine. A small 3 or 5 gallon keg will answer the same purpose. Nearly fill the jar or keg with olives. Then pour in the lye and cover the hole with a piece of board to keep out the light. At the proper time, as given previously, run out the lye and pour in water to rinse the olives, and repeat the operation as already described. By keeping the top carefully covered, there need be no haste in finally bottling the olives, for they will keep for months in the keg. Brine should be boiled, and that added last should be almost boiling hot, and should well cover the fruit, a film of oil being poured on top. Any mould should be removed at once and the olives treated with fresh hot brine and pasteurised. If the olives are too salt when opened, a soaking in fresh water for a day or two will remove the excess of salt without detriment to the olive.

# Viticulture.

## THE WINE INDUSTRY.

By G. A. GATTINO.

### CONSERVATION OF THE WINE IN THE CASKS DURING THE FIRST YEAR.

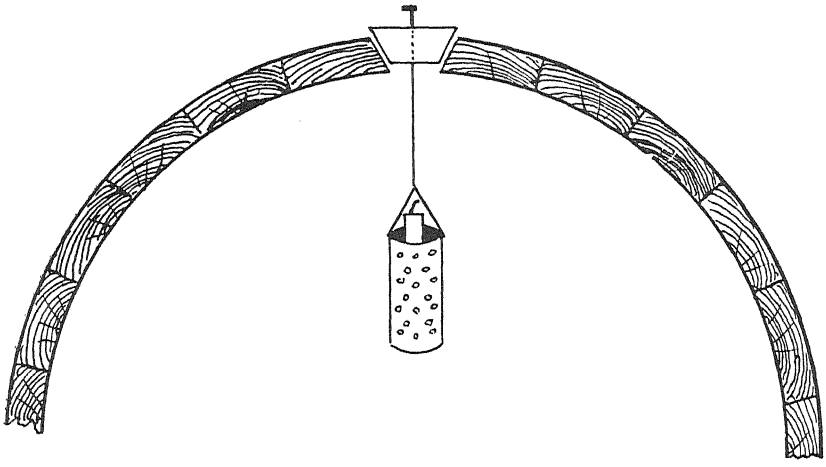
The tumultuous fermentation brings to the must such alterations as will totally change its nature and cause it to assume the qualities of the wine. At this point, however, the must has not yet acquired all the wholesome tonic and resistant characters that are required in the wine, nor has the fermentation ceased. When, after the tumultuous fermentation, the must is taken away from the dregs and transferred into other casks, continuous successive transformations will occur until the must becomes matured wine. That the wine will always go through continuous changes is proved by the fact that after each transfusion or decantation, you will always find that more or less sediment is left in the vessel from which the wine has been transferred. This deposit demonstrates that chemical reactions occurred in the wine in succession, causing the precipitation of insoluble matters. When the wine is bottled, these reactions still occur, and small sediment will always be found in the bottles. The fact being established that the wine, after the tumultuous fermentation, is still subject to transformation, it is necessary to regulate and complete these transformations with care and diligence, and so bring the wine to perfection. The must being transferred, will, after a while, work again, arriving at the phase of the insensible or slow fermentation. If the conditions are propitious, these slow fermentations will last from twenty-five to thirty days. During this phase the wine will improve effectively, and on account of its transformations will be now of defined appearance and apt to be tested.

One of the most essential conditions required to bring the wine to perfection is that the insensible fermentation occur under a moderate and constant temperature, which condition can conveniently be obtained by building a cellar in accordance with my hints appearing in the December (1916) and February (1917) issues of the Journal.

After twenty-five or thirty days, the slow fermentation being completed, the wine becomes cold, and almost all the refuse will be deposited at the bottom of the cask. As soon as the wine becomes clear it is necessary to separate it from the dregs. The racking off must be executed on a dry, calm day, preferably a cool one.

The casks into which the wine will have to be racked off should not be too large, as the duration, efficacy, and degree of the reawakening of the insensible fermentation will be in proportion to the volume of the mass. Vessels of decreasing capacity are therefore required in graduation as the wine approaches the maturity stage, the wine becoming by this

process finer and finer until ready for bottling. It may be mentioned that the vessels into which the wine has to be racked off should be sulphurated. The sulphurous acid gas will free the vessel of the presence of air and destroy any germs whose presence may bring alterations to the liquid. This sulphurating of the casks keeps the wine unalterable owing to the strong anti-fermentative action which the sulphurous fumes strongly possess, and this action renders the germs inert and without efficacy to act on the wine. The sulphurating of the casks can be executed with sulphurated matches burnt in a small iron cage of cylindrical form, as shown in the accompanying sketch.



This cage should have the sides perforated and be of a diameter not greater than that of the bung-hole of the cask, and be suspended by a wire.

The preparation of the sulphurated matches is simple, as is also the sulphurating of the casks with the above illustrated cage. Melt the sulphur in an earthenware dish, and, as soon as it is liquid, plunge into it strips of calico in width about 2 in. and in length as long as they are needed. Let them be uniformly covered with the liquid—sulphur. After a few seconds the sulphur will adhere to the cloth, and the matches are ready for use when cold.

For sulphurating the casks, suspend in the cage one of these specially prepared matches, light it, and insert the cage, with match, half-way down in the cask. To enable the cage to stop in this position, fix the suspending wire through a wooden or cork bung, of diameter greater than that of the usual bung-holes. Sometimes the match becomes extinguished as soon as it is introduced in the cask, owing to the presence of carbonic acid gas in the vessel. To remedy this, open all holes existing in the cask, so as to allow the external air to enter first. The casks after being so prepared and sulphurated are ready to receive the wine to be transferred. In racking off avoid as much as possible allowing the wine to come in contact with the air, whose constituents, excepting the oxygen, are dangerous to the wine.

[TO BE CONTINUED.]

## RAISIN DRYING AND CURING.

(Extracted from "The Raisin Industry," by Gustav Eisen, published by H. S. Crocker and Co., of San Francisco, U.S.A.)

In describing the processes of drying, curing, packing, and assorting, the only methods which should be used by every conscientious raisin-grower and packer have been followed. These methods are now actually in use, not by every packer and grower, but by the best of them, by those who strive to produce a very superior article which will compare favourably with and compete successfully with the best products of Malaga or other foreign growing districts. Raisins may be produced by cheaper methods than those advocated, but only great care, judgment, and study will produce the best results. In the raisin industry it pays to produce the best, and to attain this very little extra care is required.

### SIGNS OF MATURITY.

There are three different ways by which the ripeness of a grape can be tested—saccharometer, taste, or colour. The saccharometer is a well-known instrument, consisting of a graded glass tube that will sink to different depths in liquors containing different percentages of sugar. There are different kinds of saccharometers, but the most practical one for the general raisin-grower is one divided into 100 degrees, each degree showing one per cent. of sugar to every hundred of water. Thus, if the saccharometer sinks down to 25, we know that the "water or must" contains 25 per cent. of saccharine and 75 per cent. of water. To properly test the grapes, a few bunches should be picked from several vines; the juice should be squeezed out and passed through a towel or otherwise strained. The must is then poured into the test tube and the saccharometer inserted. If it shows 25 degrees or more of sugar, the grapes will make good raisins, but for very superior raisins, several degrees more of saccharine are needed. It is not unusual to find the grapes reach 30 degrees in favoured localities and in favoured seasons. Only inexperienced vignerons will require the aid of the saccharometer to determine the state of ripening of the grapes; the more experienced judge by taste and colour. The taste, of course, is the most commonly used method of ascertaining the ripeness of the raisin grapes. Every grower, experienced or not, should examine his grapes repeatedly. To give directions for tasting the ripeness of grapes is, of course, impossible; it must be learned and can only be learned by practice. It is enough to say here that the grapes should taste very sweet, contain no acid, and, if possible, be rather solid.

The colour is also a valuable adjunct in determining the ripeness of the rasin grapes. Fully ripe and perfect fruit should be amber-yellow, somewhat transparent and waxy. If this colour is combined with great sweetness, and in Muscatels with absence of acidity, we can be sure the grapes are ripe. Some grapes do, however, especially when too much exposed to the sun, acquire the yellow amber tint without being sweet, but they are readily distinguished from the ripe grape, by their being of smaller size, and harder, tasteless, and acid. Such grapes never

develop into good, mature grapes, and do not make good raisins. All ripe grapes do not become amber-coloured. Those that grow in the shade and on very damp ground, remain always green, although they acquire a certain sweetness and will make good raisins. The Muscatel grapes will make saleable raisins if not fully ripe, but in order to make superior and good raisins all grapes should be dead ripe, especially so if the grapes are to be dipped in lye. If unripe or partially ripe grapes of Muscat or Sultanas are dipped, they make very poor and red raisins; it would be better if they had never been dipped. This is especially so with the Sultana, which begins to ripen and is eatable long before the Muscat, but which only makes a good dipped raisin after the Muscat has been ripe for some time. Three or four days make a great difference sometimes in the amount of sugar in the grapes, and consequently in the quality of the raisins, and the experienced grower will keep his grapes on the vines as long as possible to attain the greatest possible amount of sweetness. But, on the other hand, it takes judgment to foresee how sweet the grapes will be, as in unfavourable seasons they will not attain their full sweetness even if allowed to hang long on the vines. To know the time after which the grapes do not increase in sugar, requires much experience and acquaintance with the locality where they are grown. In this respect different years vary very much.

## PICKING.

Many vignerons pick their grapes too green or before they are fully ripe. Not all grapes ripen at the same time, and to make the best possible raisins out of the grapes, it is necessary to pick over the vineyard several times, each time picking only the ripest grapes.

In places where there are two crops of grapes, at least two pickings are necessary, and in many places two pickings are enough. The green grapes of the first crop are then left to be picked with the second crop, at which time they will probably be perfectly ripe and very choice. But if the vineyard is small and easily managed and the owner wishes to realise the most he possibly can, he should make at least three different pickings, each time taking care to pick only those that are fully ripe, and which would make a first-class quality of raisins. The pickers generally use small, pointed knives for separating the bunches, and they are preferable to small shears, as better enabling the picker to reach farther in between bunches and branches and to cut the former without injuring the branch.

In picking great care should be taken. It is always best to begin picking in the poorest part of the vineyard, and some experience is needed by the pickers that they do not pick too many green grapes. The poorest part of the vineyard is also apt to have the ripest grapes. The large fine bunches should be handled with the greatest care, so that the bloom of the grapes may not be injured. The bunches generally should be handled by the stems only, and if this be impracticable, by the stem as much as possible. In separating a large bunch from the vine, the bunch should be cut as close to the stem as possible, and at the end

of the stem of the bunch there should remain a portion of that broader part by which the bunch is attached to the main branch. A picker should average not less than fifty trays a day of cleaned and assorted grapes. The picking of the grapes is facilitated by the previous care given to the vines. Neglected and entangled vines are much more difficult and expensive to pick than those which have been properly cared for and correctly pruned the season before.

## CLEANING.

When the bunch is picked or cut from the stem, it should be cleaned. If it is a first-class, or even an ordinary large bunch, every sunburnt berry, every leaf, twig, or other conspicuous foreign substance must be carefully removed with the picker's right hand while the left hand holds the bunch by the stem. This cleaning must at some time be done, and at no time can it be performed with better results than when the grapes are green. The stems are then soft and flexible, while later on they are brittle, and in endeavouring to remove foreign substances many berries will be detached and sometimes even the whole bunch broken. This cleaning of the bunch does not extend to third-rate or small bunches which are to be used for loose raisins. The latter can be cleaned very rapidly by machinery, and it would only be a waste of time to clean them by hand-picking. The use of a pair of bellows is also very practical. With these much of the spiders' webs and smaller refuse can be removed, which could not be got rid of in any other way. If the grapes are carefully assorted when picked, and the different grades placed on separate trays as they should be, this cleaning is done rapidly, as the largest part of the crop, which will only make loose raisins, need not be cleaned.

## DRYING ON TRAYS.

As soon as the grapes begin to ripen, the trays should be distributed along the rows in the vineyard. They may either first be placed in piles at every row where the roads cross the vineyard or at once distributed along the vines. The former method is to be preferred, as it protects the trays from dirt and dust. Muscat vines in proper bearing require one or two trays to the vine, while for young vines one tray will suffice. The ripe grapes are placed directly on the trays and not previously packed in boxes. In placing the bunches on the trays, it is better the picker should have two trays, one for each grade. On one tray he places the large bunches that promise to make first-class bunch raisins; on the other, the inferior and loose berries. The large bunches should be placed on the trays, stem-side down, as this side will, when cured, become the finest and will eventually be graded by the careful packer as first-class. The smaller bunches and loose berries may be placed any way almost, so long as they are not heaped on one another. That part of the raisin which, in drying, touches the tray, will also present, when cured, a flat surface with several concentric layers, which are considered a prominent feature in the perfect raisin. The large bunches dry the slowest, and by having them from the beginning separated from the small and the loose, the latter can be brought away to the sweat boxes

when ready without necessitating the reassorting and handling from the trays, which at this time, when the stems are brittle, is expensive and injurious to the fine bunches. The larger bunches which are to produce layer raisins require less drying, as they are to be sweated or equalised before being packed. The smaller and inferior bunches, on the contrary, must be stemmed and assorted before they are equalised and immediately after they are taken from the trays. In order to stem readily, these raisins must be rather overdried, as if soft they would tear from the stems instead of having the latter broken. The advantage is, therefore, seen of having the two grades on different trays. Without the necessity of assorting, the layer trays can be taken up when they are ready and the loose can remain as long as necessary without fear of the layers being overdried. By this assorting when green, each grade can be treated separately in a quick and effective way. A tray 2 ft. by 3 ft. may be made to hold comfortably from 18 to 20 lb. of grapes. The first crop should be placed pretty close on the trays so that no part of the tray may be visible, as the reflected heat will be too great and may injure the raisins. The second crop should be packed less closely, as the reflected heat from the surface of the tray will help to dry the grapes. This, of course, only refers to localities where the temperature during the first drying is high. The warmer it is, the closer should the bunches be packed on the trays, but when the drying weather is unfavourable, plenty of space should be given to the grapes. It is often said that grapes, to make good raisins, should not only dry but cure. Good raisins should dry and cure at the same time, by which is meant that a chemical process is taking place which is something more than the mere evaporation of the water in the grape. The heat necessary and favourable for drying the grapes is different in different localities. At certain temperatures the raisins will get cooked and spoil, assume a red colour, lose their sweetness, become sour and hard, and covered with large, sharply-defined corrugations—signs of a very inferior or even entirely worthless raisin. It is thought that from 90 to 103 degrees in the shade would be the best temperature for drying perfectly ripe and sweet Muscat grapes. When grapes are very ripe, a much higher temperature will not injure them, while sour and unripe grapes, especially of the second crop, will burn or cook at a lower temperature than would be the proper one for ripe grapes. It is not always advisable to stop picking when the heat becomes too great. A better method is to stack the trays in the field so as to protect the raisins from the sun. When the heat subsides, the trays are again spread. Some packers have suggested that to secure good raisins the trays should be stacked for several weeks in the beginning of the period of the drying. For the production of the usual dark-coloured raisins this is not necessary nor even advisable, except when the heat is such that the raisins would cook and spoil. With a little experience this cooking of the grapes can easily be detected by the smell emitted by the grapes. As soon as they are the least injured by the heat, a cooked flavour begins to pervade the whole vineyard. When this peculiar flavour is noticed, and when the berries begin to show small red and soft blotches on the side facing the afternoon sun, the

stacking should be commenced as quickly as possible. If the trays are kept in piles for several days, the injured grapes will partially recover and at least to some extent regain their colour. Greatly injured grapes will dry much slower, sometimes remaining several weeks behind those which were not injured by the sun. Slightly discoloured raisins may partially regain their colour by sweating, but they will not otherwise improve.

After the trays are filled with grapes the best way is to put several rows of trays together, or, rather, place the trays from three rows of vines along one of the spaces between the rows. This gives more compactness to the crop, makes it easier to handle the trays, and facilitates the stacking of the trays, their turning and reversing, or any labour with them that may be required. By thus clearing some of the spaces between the rows, admissions for trucks and wagons is obtained close to the trays.

## TURNING.

After the grapes have been exposed to the sun for some time they must be turned. By this time it will be found that the grapes have dried principally on the upper side, while the lower side is comparatively green. The time when the turning of the grapes should be done depends entirely upon the weather. One-half of the drying process should be over, and this requires a longer or a shorter time. When the time for turning has arrived, it will be found that the under side of the grapes, or, rather, the side of each berry that was placed against the trays, has flattened out and shows concentric circles, which are considered of much beauty, and greatly valued in all good raisins. When they are well formed and established it is generally time to turn. If the grapes are turned before these concentric circles are hardened, the latter will open and become less distinct. Another objection to turning too early is, that the upper side of the grapes, if not properly dried before turning, will dry but very slowly afterwards, and often so slowly that the raisins may have to be turned a second time, which will prove both expensive and to the disadvantage of the raisins. One turning is always enough and the only one proper. Turning should, as much as possible, be done in the morning or at least in the forenoon, while the air is yet cool and the stems of the raisins damp.

## REVERSING.

This is an operation not properly understood by every raisin-grower, but it is still of the utmost importance, especially for the first-class bunches of the first crop, which naturally dry much slower than the smaller bunches. But the method is also very useful for the second crop, when late in the season the drying is slow and uncertain. The reversing consists simply in reversing the trays in such a way that the edges which first faced the north, afterwards face the south, and *vice versâ*. The object of reversing is plain. It will nearly always be found that the raisins at the top or on the side of the tray nearest the north will dry

much more slowly than those on the side facing the south. To prevent this and to ensure equal drying at the top and bottom, the reversing is performed after the trays have been first turned. This will enable the grower to dry his raisins several days sooner than he otherwise would. Indeed, at a critical period of drying, as when rains may fall and injure the raisins, it is of the utmost importance to hurry the crop as much as possible. The reversing at this time is almost as important as turning.

## ELEVATING THE TRAYS.

It is a good thing to elevate the trays containing the tail end of the second crop. The best way is to place the trays on the top of the vines, when it will be found that the free circulation of air underneath will help to dry the raisins, and prevent rot and mould.

## STACKING AGAINST RAIN AND DEW.

The stacking of the trays is also a valuable help in keeping out dew and cold. When heavy rains are expected, the grapes, whether partially dried or not, should always be stacked. It will keep the stems from rotting off from the berries, and will generally save the crop from being seriously injured. There are several ways of stacking. The flat stacking is used principally when the raisins are very dry, and when it is of importance that no air should enter the trays. In flat stacking, one tray is simply placed on top of another, and the circulation of air is thus brought to a minimum. In rainy weather the roof stacking is to be preferred. Instead of placing one tray on the top of another, the trays are placed in two piles, joining each other in such a way that the inner end of every tray overlaps the edge of the tray in the adjoining pile. The lifting up of one edge of the tray gives to the whole pile a roof-like appearance, and the angle in which the trays join together becomes steeper the higher the pile grows, until at the height of 3 or 4 feet the trays slant so much that the raisins cannot rest on them, but are in danger of sliding off, when, of course, the pile should not be made any higher. The advantage of roof-stacking is that it admits the air and sheds the rain better. In damp weather the piles should not be covered on the sides for any length of time, as the raisins will then mould more rapidly. If instead of joining two piles of trays three are made to join, the centre stack will be flat, while much air is admitted to the raisins. In this stacking the two first trays are placed flat on the ground at almost the distance of one tray. It must be remembered that in very rainy weather no kind of stacking will be of any value, while when the showers are few and far between stacking may save the crop. Stacking is especially valuable in conjunction with dryers, when protection during a few days only is all that is needed.

[TO BE CONTINUED.]

# Tropical Industries.

## COCOA.

The "Journal of the Jamaica Agricultural Society" of November, 1916, gives the results of experiments which have been carried on for a series of years in the manuring of cocoa and shade for cocoa. From this we gather that from 1914 to 1915 the rainfall on River Estate, Trinidad, was only 60·44 in., and the season is represented as not being a favourable one. Nevertheless several of the manured plots gave an increase in yield compared with the crop of the previous year. The previous results that we published in this Journal showed great variation of yields from different combinations of manures and fertilisers. By manures we mean animal and vegetable matter; by fertilisers mineral plant foods. In Dominica results of experiments on cocoa resulted in the heavily mulched plots giving the best yields and best net results in profit. In Trinidad mulching was found too expensive, and while often resulting in large yields did not give substantial net profits. It is the net profit that counts. For instance, a combination of 200 lb. sheep manure, 100 lb. bonemeal, and 25 lb. sulphate of potash resulted in a return of 10,542 pods per acre over five years, while no manure gave 9,501 pods, but the net profit after deducting cost of manuring was 73·74 dollars for the manured plot and 87·12 dollars for the non-manured plot. On the contrary, a combination of 3,600 lb. pen manure, 100 lb. basic slag, and 13 lb. sulphate of potash per plot. gave 16,146 pods and a net profit of 128 dollars, the fourth largest of all. The third largest resulted from an application of 178 lb. bird manure, which gave a net profit of 132·88 dollars. A second control plot, to which no manure was added, gave 14,055 pods and a net profit of 128·81 dollars. The second largest net profit resulted from an application of 94 lb. bird manure, 25 lb. sulphate of ammonia, and 50 lb. sulphate of potash, giving a yield of 19,857 pods and a net return of 163·59 dollars. This was also the second largest yield of pods and of dry cocoa, the latter being 1·655 lb. Each plot is 1 acre and contains 300 trees. The largest net profit of 173·41 dollars from 21,000 pods and 1,750 lb. of dried cocoa resulted from an application of 3,600 lb. of pen manure, 13 lb. sulphate of ammonia, and 25 lb. sulphate of potash, the cost of which was 19·09 dollars. Lime alone gave a poor return of only 58·03 dollars and 10,000 lb. of mulch only gave a net return of 51·64 dollars, both much poorer than no manure at all. Mulching apparently is of no avail on that particular estate.

In the second series of experiments, comparisons are made of the yield of individual trees under the same conditions. The yields vary from an average over four years of 14·67 pods up to 70. These are from the manured fields. The natural yield of unmanured trees ranged from 16·93 to 34·26. The average number of pods per lb. of dry cocoa was 11·32 over four years.

* * * * * * *

The next series of experiments is with—shade, partial shade, no shade. The following are the results for trees thirty to thirty-five years old this year, average number of pods over five years:—

| | |
|---|---|
| Full shade | 8·863 |
| Partial shade | 10·222 |
| No shade | 9·889 |

In the experiments on nine to ten years old trees where suckers were allowed to grow, the 3, 2, 1 and no suckers resulted as follows:—

| | Pods. |
|---|---|
| No suckers | 12,333 |
| One | 12,375 |
| Two | 11,505 |
| Three | 11,124 |
| All suckers | 9,768 |

In twenty-five to thirty years old trees the result was as follows:—

| | Pods. |
|---|---|
| No suckers | 13,140 |
| One | 11,257 |
| Two | 8,645 |
| Three | 11,541 |
| All | 12,514 |

## THE GERMINATION OF THE COCONUT.

In the "Journal of Heredity" for April last is to be found the result of a most interesting study of this phenomenon by Messrs. Cook and Doyle, of the U.S.A. Department of Agriculture.

The article opens with the laconic remark that "coconuts are seeds," but as the term coconut is applied in the article itself to the nut with the husk on, the statement is somewhat misleading. In reality the coconut is a drupe or stone-fruit, in which the stone is enveloped in a fibrous mesocarp. The true seed lies within the hard woody endocarp or shell of the so-called "nut," which, by the way, is again a misnomer.

The authors dispute the theory of maritime distribution, maintaining that the coconut is neither a seashore plant by nature nor dispersed by the sea. In support of their contention they state that the same type of husk which characterises the coconut, and leads people to believe that it is intended to float in water, is found in many other species of palms which do not grow on the seacoast and are known never to be distributed by water; while the waxy coating on the husk (believed to be a water-proof material) is common to all palms and found specially well developed in many inland species.

In spite of the coconut being so abundant and of such economic importance in the Pacific Islands, there is, according to the authors, nothing to show that its habits enable it to exist permanently or in a truly wild state in a littoral or oceanic environment. The common belief of its being a native of this region is stated to be contrary to the opinions

of those who have studied the palm as it grows in the Pacific Islands. These authorities are of the view that there are no wild coconut palms in the Pacific, that it has everywhere been actually planted by man, and that the palm does not survive human neglect for any period.

It is argued from the store of water in the interior, the large supply of solid endosperm and the thick fibrous husk, that the native habitat of the coconut must have been a relatively dry clime where the plant had to grow to a fairly large size before it could draw upon soil moisture; while on the other hand such provision would seem unnecessary in a maritime plant. The great size of the nut would indeed be a disadvantage in this latter situation as preventing it from being buried in the sand. We must, therefore, according to the authors, think of the coconut as an interior palm growing in an alkaline soil and subject to prolonged droughts, in order to appreciate the significance of its large seed, its copious supply of endosperm and water and thick spongy husk capable of absorbing moisture when brought within reach of it. As is generally known, the coconut is also intolerant of shade, and this points to its original habitat being a region where other vegetation was absent or very sparse.

Going back to the husk, one cannot fail to notice its suitability as a medium of starting the growth of roots. Indeed, the coconut may be likened to "a self-potted plant," and the hanging up of coconuts till the whole process of germination is complete, and the green plant has appeared, is a fairly common practice which supports this view.

A remarkable thing about the coconut is the small size of the embryo or living germ in comparison to its other parts. It is a tiny cylindrical body lying just beneath the largest eye in the shell. When germination begins the embryo elongates and enlarges at both ends. From the outer end arise the young stem and roots, while internally is formed a large spongy mass called the cotyledon through which are scattered vascular strands which converge and become fibrous at the narrow neck connecting the spongy mass with the stem.

The function of the cotyledon is to convey the food material derived from the solid endosperm to the seedling plant. In order to be absorbed this material has to be digested under the influence of the ferments secreted by the cotyledon and passed into the water contained in the central cavity.

The fluid-filled cavity would in addition to its storage function appear to play the part of a stomach to provide for the digestion and absorption of food material stored in the solid endosperm. In this way the milk would be periodically recharged with food materials to replace those absorbed by the cotyledon.

It is unnecessary to follow the various changes in composition of meat and water which take place as the process of germination goes on.

The original article appeared in the "Journal of Heredity," to which periodical we duly acknowledge our indebtedness.—"Fiji Planters' Journal."

## THE ALGAROBA TREE IN CYPRUS.

The seeds are placed in layers in damp sand and, being well watered, they are left thus for about twenty days, by which time the shell has burst, and the young cotyledon visibly projects. The germinated seeds are then taken up from the boxes or beds and sown directly into holes properly prepared for their permanent growth. The plan is simple, and does away with the trouble and expense of pots and of watering the plants while in pots or in beds. The young plants grow much more quickly and sturdily than when transplanted at a later age, and the number of failures is quite insignificant. The Department of Agriculture in Cyprus, after some trouble, induced the villagers in a district characterised by a total absence of vegetation to plant algaroba and almond trees in Morphou Plain, providing both seed and expert advice. The result in 1916 was that some 15,000 trees were raised in that year, and large numbers were also planted in other parts of the island. Seedlings do not come true to product in the case of the carob, another variety of tree bearing the fruit known as Locust, or St. John's Bread, and these require to be grafted, as the tree is dicecious—*i.e.*, bearing male and female flowers on different plants. In the case of the Algaroba it would seem that grafting or budding are not necessary, in proof of which a number of Algaroba seedlings were taken from Sydney to the Pera Artesian Bore, near Bourke, a distance of 500 miles. The trees throve wonderfully, and developed into magnificent specimens, bearing heavy crops of fruit.

We have a great deal to learn about the Algaroba, which is usually confounded with the carob, the botanical name of the former being *Prosopis juliflora*, and of the latter *Ceratonia siliqua*.

## STATE INSTRUCTOR IN POULTRY.

Mr. J. Beard, who has been appointed Instructor in the Poultry Industry in this State, has a long record as a successful breeder of most varieties of poultry. His successes in prize-taking at many agricultural shows in Queensland, and notably at the National Agricultural and Industrial Association's exhibitions at Bowen Park, have been almost phenomenal. His services as a judge at country shows were constantly requisitioned, and in no case, as far as we know, were his judgments called in question by exhibitors. In connection with his work at the Department of Agriculture and Stock, Mr. Beard will give his attention to compiling a booklet dealing with all phases of the industry—a work for which his intimate knowledge of the business especially qualifies him.

# Entomology.

## THE CANE-BEETLE.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, the Entomologist:—

With reference to investigations conducted this season to study more fully the nocturnal habits of our "grey-back" cane-beetle, it may be of interest to record additional data relating to this insect, and to *Lepidiota frenchi*, Blackb., a smaller reddish-brown scarabaeid affecting cane.

These observations were made at the "Carrah" Plantation, near Gordonvale, on fourteen different evenings, between the hours of 6 and 10 p.m., the artificial light used being an acetylene lamp giving an illumination of 21 litres.

The following notes briefly summarise results obtained in this connection from the dates 15th November to 28th December:—

1. Unlike previous experience, in 1914, many specimens of albohirta were attracted before daylight had quite disappeared. Early in the season (15th to 25th November) flight commenced at 7 o'clock, reaction generally taking place at about 7.20 p.m.; whereas during December, 1914, the time spent on the wing prior to entering the light-trap was just forty minutes (7.20 to 8 p.m.).

2. This species displays great aerial activity when the thermometer stands above 80 and not lower than 75 degrees Fahr., but at 70 degrees Fahr. flies less freely, while a low temperature, such as 65 degrees Fahr., apparently stops flight altogether and renders the beetles torpid.

3. The duration of the period usually passed on the wing each evening depends, too very materially, on the amount of moisture in the ground. Emergence of the beetles this season was not followed by showery weather, and in proportion as the surface soil each day became drier the time occupied by flight during twilight decreased very noticeably. On 21st November, for example (seven days subsequent to the appearance of this insect) albohirta flew for about twenty-five minutes only, the temperature at the time being 76 degrees Fahr.; and a couple of days later, the weather still continuing very sultry, not a single specimen was heard flying at the usual hour, although the dry bulb registration was 78 degrees Fahr. This failure of albohirta to appear on the wing was again noted on 25th November (75 degrees Fahr.), when, however, numbers of *Anomala australasiæ*, Blackb.—a small cane-beetle of a deep bronzy-green colour—were observed at dusk circling about and settling upon the foliage of certain native shrubs. Further scientific data respecting albohirta was obtained, but need not be recorded at present.

On 13th to 14th December heavy rain fell at Meringa, and was at once followed by the primary emergence of *Lepidiota frenchi*. This well-known cockchafer, which occurs practically throughout open forest country, proved excessively abundant last December.

Its larvæ subsist on the roots of grasses and various herbaceous plants, but frequently attack sugar-cane, and are, no doubt, responsible at times for much damage to this plant.

At "Carrah," on 15th December, ample opportunity was afforded for studying the aerial movements of frenchi, which, being on the whole rather remarkable, are worthy of brief notice.

Flight commences upon the first approach of twilight (6.45 p.m. on the occasion in question), when suddenly, and without warning of any kind, myriads of these beetles start up simultaneously from every quarter and wildly dash to and fro as though determined to exercise their wings to the utmost. The scene strikes one as being decidedly novel, and, apart from its scientific aspect, well worth witnessing.

Standing among the cane-stools one seems to be encompassed by an immense swarm of beetles—thousands being in view at the one time—which in their erratic and ill-directed flight are constantly striking against the cane-leaves, the clapping noise produced by the sudden impact being plainly audible at a distance of several yards.

In addition to this oft-repeated sound the air, so still before, vibrates loudly with a continuous hum due to the accumulated buzzing of countless numbers of these insects. Although scarcely within the province of a monthly progress report, it may be of passing interest to mention that I found this humming note to be B natural—eight tones below the middle C of a piano at concert pitch—and very different from the deep tremulous drone that characterises the flight of our "grey back" cane-beetle.

The turmoil I have tried to depict lasts for about ten minutes, and then, ceasing abruptly, is immediately succeeded by copulation. At this stage the beetles may be seen on all sides clinging in couples to the cane-leaves at a height of 3 or 4 ft. above ground level, and if picked off from the foliage will lie quietly in the hand without making the least attempt to escape.

As previously pointed out in 1915 ("Australian Sugar Journal," Vol. VI., p. 893), plantations allowed to remain weedy whilst this cockchafer is in evidence are subject to infestation. I regret, however, to have to record that conclusive proof as to its having acquired a decided liking for cane was obtained last month, when upon examining land at Meringa under thoroughly clean cultivation both the eggs and newly-hatched grubs of this beetle were discovered among the main roots of the cane within an inch or two of the stools.

Important laboratory experiments were instituted this month (January), with a view to determining the effect of different stomach poisons upon very young larvæ of *Lepidiota albohirta*, Waterh.

This line of research work has necessitated the design and construction of special apparatus, by means of which it is possible to conveniently study the movements or tropic reactions of a grub to various stimuli whilst it is in the soil.

Some of the results obtained in this connection are decidedly encouraging, and will be reported in due course.

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## THE COTTON-BOLL WORM.

In the issue of this Journal for August, 1916, we suggested a method of protecting the cotton-bolls from the worm which attacks maize in the cob, by planting alternate rows of cotton and maize. In January last, a letter was received by the Department of Agriculture and Stock from the Assistant Director of Agriculture, Department of Agriculture and Forests, Sudan Government, inquiring which boll-worm it is that can be dealt with in this manner, and stating that "in the Sudan cotton is liable to attack from two boll-worms—the Egyptian boll-worm (*Earias insulana*) and the Sudan boll-worm (*Diparopsis castanea*), while in one isolated district we have a slight infection of the pink boll-worm (*Gelechia Gossypiella*), which has caused so much loss in Egypt during the last three or four seasons." The Assistant Director of Agriculture in the Sudan, Mr. R. Hewison, further writes: "None of these pests, so far as my experience goes, ever attack either maize or cowpeas in the Sudan, but confine their attention to cotton or other malvaceous plants."

The matter was referred by this Department to the Government Entomologist, Mr. H. Tryon, who reported as follows:—

"The reference in the 'Queensland Agricultural Journal' (August, 1916) to a method of trapping boll-worms by interplanting with maize or cowpeas, doubtless relates to the larger of the two lepidopterous insects that in Queensland affect the cotton in such a manner as to merit the designation of 'boll-worm.' This insect is the pyralid moth (*Dichocrosis punctiferalis*), that not only feeds upon the cotton but includes a number of other plants in its dietary, and has, moreover, a wide range of occurrence in India, the Eastern Archipelago, Australia, &c. We have a second boll-worm that is congeneric with the Egyptian boll-worm, if not identical with it, but this, of course, is not partial to the maize.

"It may further be pointed out that this office* is not only not responsible for advocating the method of controlling or subjugating the Queensland Cotton-boll Worm prescribed in the official organ of our Department of Agriculture, and that has claimed Mr. Hewison's attention, but it is a method that it has positively discountenanced, observation having shown that the growing maize will attract the insect to places where already it does not occur, and that, when thus attracted, the moth will attack, simultaneously and indifferently, cotton and corn (maize) alike, the former being damaged where otherwise it might escape injury."

* Office of the Government Entomologist and Plant Pathoolgist.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH JANUARY TO 26TH FEBRUARY, 1917.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Sylvia II. ... | Shorthorn... ... | 16 Jan., 1917 | 1,115 | 4·6 | 60 44 | |
| Lady Margaret | Ayrshire ... ... | 6 Jan. ,, | 1,111 | 4·3 | 56·21 | |
| Miss Edition | Jersey ... ... | 25 Dec., 1916 | 942 | 3·8 | 41·96 | |
| Violette's Peer's Girl | ,, ... ... | 13 Dec. ,, | 671 | 5·2 | 41·22 | |
| Lady Spec... | Ayrshire ... ... | 17 Jan., 1917 | 925 | 3·8 | 41·21 | |
| Iron Plate ... | Jersey ... ... | 9 Dec., 1916 | 725 | 4·8 | 41·04 | |
| Comedienne | ,, ... ... | 24 Nov. ,, | 604 | 5·6 | 40·00 | |
| Thorntons Fairetta | ,, ... ... | 26 May ,, | 542 | 6·2 | 39·81 | |
| Constancy ... | Ayrshire ... ... | 27 Dec. ,, | 822 | 4·1 | 39·60 | |
| Sweet Meadows | Jersey ... ... | 18 Aug. ,, | 538 | 6·0 | 38·24 | |
| Twylish's Maid | ,, ... ... | 2 Nov. ,, | 602 | 5·3 | 37·70 | |
| Miss Bell ... | ,, ... ... | 1 Aug. ,, | 542 | 5·8 | 37·19 | |
| Lady Annette | Ayrshire ... ... | 11 Nov. ,, | 747 | 4·2 | 36·87 | |
| Lilia ... | ,, ... ... | 4 Sept. ,, | 653 | 4·6 | 35·38 | |
| Bluebelle ... | Jersey ... ... | 22 June ,, | 633 | 4·7 | 35·07 | |
| Jeannie ... | Ayrshire ... ... | 27 Oct. ,, | 677 | 4·3 | 34·25 | |
| Nina ... | Shorthorn... ... | 23 June ,, | 742 | 3·9 | 33·95 | |
| Lady Dorset | Ayrshire ... ... | 14 Sept. ,, | 610 | 4·4 | 31·59 | |
| Princess Kate | ,, ... ... | 20 June ,, | 468 | 5·1 | 28·18 | |
| Queen Kate | ,, ... ... | 15 June ,, | 716 | 4·2 | 28·18 | |
| Skylark ... | ,, ... ... | 21 March ,, | 518 | 4·6 | 28·07 | |
| Hedges Dutchmaid | Holstein ... ... | 22 Aug. ,, | 565 | 4·2 | 27·89 | |
| Mistress Bee | Jersey ... ... | 21 Jan., 1917 | 523 | 4·5 | 27·72 | |
| Glen ... | Shorthorn... ... | 18 Jan. ,, | 680 | 3·4 | 27·01 | |
| Rosine ... | Ayrshire ... ... | 16 July, 1916 | 570 | 4·0 | 26·77 | |
| Netherton Belle | ,, ... ... | 11 March ,, | 438 | 4·9 | 25·31 | |
| Charity ... | Jersey ... ... | 28 May ,, | 444 | 4·6 | 24·06 | |
| Auntie's Lass | Ayrshire ... ... | 4 April ,, | 469 | 4·2 | 23·14 | |
| La Hurette Hope | Jersey ... ... | 6 Oct. ,, | 412 | 4·7 | 22·82 | |
| Leonie ... | Ayrshire ... ... | 16 Aug. ,, | 463 | 3·7 | 20·07 | |

The above cows were grazed on natural pasture only.

## BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following list of breeders in Queensland of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in this State. The Department of Agriculture and Stock undertakes no responsibility in relation to the entries in the list; but, when making inquiries, the condition was imposed that the entries were to be comprised only of the stock that had been entered in a herd book or are eligible for entry.

The list as now published is incomplete; it includes the information received to date, and will be added to from time to time. Any owner desiring to have his stock included, should notify the Under Secretary of the breed of purebred stock he owns, the number of males and females entered or eligible for entry in a herd book, and the herd book in which they are entered.

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| **AYRSHIRES.** | | | | |
| Queensland Agricultural College | Gatton .. .. | 14 | 45 | Ayrshire Herd Book of Queensland |
| State Farm .. .. | Warren, Rockhampton | 9 | 88 | ditto |
| H. M. Hart .. .. | Glen Heath, Yalangur | 6 | 15 | ditto |
| L. H. Paten .. .. | Joyandel, Calvert .. | 8 | 20 | ditto |
| J. H. Paten .. .. | Yandina .. .. | 8 | 23 | ditto |
| J. H. Fairfax .. .. | Marinya, Cambooya | 9 | 55 | ditto |
| State Farm .. .. | Kairi .. .. .. | 4 | 8 | ditto |
| F. A. Stimpson .. | Ayrshire Stud Farm, Fairfield, South Brisbane | 17 | 68 | ditto |
| J. W. Paten .. .. | Wanora, Ipswich .. | 10 | 42 | ditto (Includes 29 cows in advanced register.) |
| J. Holmes .. .. | "Longlands," Pittsworth | 6 | 20 | Ayrshire Herd Book of Queensland |
| **JERSEYS.** | | | | |
| W. Siemon & Sons Ld. | Roma st., Brisbane .. | 6 | 60 | Queensland Jersey Herd Book |
| Queensland Agricultural College | Gatton .. .. | 13 | 30 | ditto |
| W. J. Barnes .. .. | Cedar Grove .. | 10 | 27 | ditto |
| W. J. Affleck .. .. | Grasmere, N. Pine .. | 6 | 31 | ditto |
| M. W. Doyle .. .. | Moggill .. .. | 4 | 12 | ditto |
| State Farm .. .. | Kairi .. .. .. | 6 | 40 | ditto |
| James T. Turner .. | The Holmwood, Neurum | 1 | 5 | ditto |
| Robert Conochie .. | Brookland Jersey Stud Farm, Brooklands, Tingoora | 9 | 21 | ditto |
| G. A. Buss .. .. | Bundaberg .. .. | 5 | 14 | ditto |
| T. V. Nicholson .. | Windsor .. .. | 2 | 8 | ditto |
| Geo. H. Crowther .. | Montrose, Oakey .. | 7 | 43 | ditto |
| E. F. Fitzgibbon .. | Listowel, Oakey .. | 7 | 30 | ditto |
| M. F. and R. C. Ramsay | Talgai, Clifton .. | 5 | 37 | Jersey Cattle Society, Queensland |
| J. N. Waugh & Sons .. | "Prairie Lawn," Nobby | 2 | 44 | Queensland Jersey Herd Book |
| T. Mullen .. .. | Chelmer .. .. | 3 | 20 | ditto |
| **GUERNSEYS.** | | | | |
| Queensland Agricultural College | Gatton .. .. | 2 | 2 | Eligible but no Herd Book in Queensland |

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| **HOLSTEINS.** | | | | |
| Queensland Agricultural College | Gatton .. .. | 3 | 10 | Holstein-Friesian Herd Book of Australia |
| George Newman .. | Wyreema .. .. | 9 | 37 | ditto |
| F. C. G. Gratton .. | Towlerton, Kingsthorpe | 2 | 11 | Eligible for entry n Holstein-Friesian Herd Book of Australia |
| State Farm .. .. | Kairi .. .. .. | 1 | 2 | ditto |
| R. S. Alexander .. | Glenlomond Farm, Columboola | 3 | 1 | Holstein Friesian Herd Book of Australia |
| S. H. Hosking .. | Racing Plains, Toogoolawah | 2 | 23 | ditto |
| C. Behrendorff .. | Inavale Stud Farm, Bunjurgen, *via* Boonah | 5 | 10 | ditto |
| **ILLAWARRA.** | | | | |
| John Hardcastle .. | Dugandan .. .. | 5 | 17 | Illawarra Herd Book of Queensland |
| Hunt Bros. .. .. | Maleny .. .. | 3 | 62 | ditto |
| W. F. Savage .. | Ramsay .. .. | 2 | 29 | ditto |
| G. E. J. Chaseling .. | Brundah, Coolabunia | 1 | 45 | ditto |
| P. Biddles .. .. | Home Park, Netherby | 3 | 14 | ditto |
| A. N Webster .. | Yaralla, Maleny .. | 5 | 65 | ditto |
| A. Pickels .. .. | Blacklands, Wondai | 4 | 82 | ditto |
| J. P. Perrett & Son .. | "Corndale," Illawarra Stud, Coolabunia, *viâ* Kingaroy | 4 | 52 | ditto |
| H. Marquardt .. .. | Oak Villa Stud, Wondai | 5 | 20 | ditto |
| Wm. Wyper .. .. | "Strathobi," Maleny, Landsborough | 3 | 100 | ditto |
| **MILKING SHORTHORNS.** | | | | |
| A. Rodgers .. .. | Torrans Vale, Lanefield | 3 | 18 | Milking Shorthorn Herd Book of Queensland |
| Wm. Rudd .. .. | Airedale, Christmas Creek, Beaudesert | 6 | 30 | ditto |
| W. Middleton .. .. | Devon Court, Crow's Nest | 3 | 27 | ditto |
| P. Young .. .. | Talgai West, Ellinthorp | 11 | 60 | ditto |
| **BEEF SHORTHORNS.** | | | | |
| T. B. Murray-Prior .. | Maroon, Boonah .. | .. | 17 | Queensland Shorthorn Herd Book |
| T. B. Murray-Prior .. | Maroon, Boonah .. | 2 | 20 | Australian Herd Book |
| **HEREFORD.** | | | | |
| H. F. Elwyn .. .. | Gunyan, Inglewood | 250 | 750 | Australian Hereford Herd Book |
| Mrs. Lumley Hill .. | Bellevue .. .. | 45 | 127 | Entered or eligible for entry A.H.H.B. |
| James T. Turner .. | The Holmwood, Neurum | 25 | 50 | Australian Hereford Herd Book |
| A. J. McConnel .. | Dugandan, Boonah | 43 | 60 | ditto |

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| **ABERDEEN ANGUS.** | | | | |
| G. C. Clark .. .. | East Talgai, Ellinthorp | 4 | 10 | Entered or eligible for N.Z.H.B. |
| **SHORTHORN.** | | | | |
| C. E. McDougall .. | Lyndhurst, Warwick | 25 | 50 | Entered or eligible Q.H.B. |
| W. B. Slade .. .. | East Glengallan, Warwick | 77 | 283 | Queensland Shorthorn Herd Book |
| W. T. Scrymgeour .. | "Tara," Arthur st., Toowoomba | 79 | 300 | ditto |
| McFarlane Bros. .. | Kilbirnie Stud Farm, Radford | 4 | 37 | Milking Shorthorn Herd Book |
| **SUSSEX.** | | | | |
| James T. Turner .. | The Holmwood, Neurum | 2 | 4 | Sussex Herd Book |

## PAINLESS DEHORNING.

We have published, on several occasions, directions for dehorning calves and cows, the first of which appeared in the issue of the Journal for February, 1899; but, notwithstanding the obvious advantage of preventing the growth of horns on dairy stock, very few dairymen appear to appreciate the fact that horns, although they may sometimes be ornamental, are usually useless, expensive, and dangerous luxuries. To prevent the growth of horns, calves under three weeks of age, and even up to twenty months, can have the embryo horns removed, and no sign of a horny growth will appear on them again. Mr. R. E. Swan, of Landsborough, sends us the accompanying photograph of a portion of Mr. R. L. Burn's dehorned dairy herd at Mondure North, Wondai. The latter has made dehorning a practice among female cattle for seven or eight years, and is quite satisfied with its economy and the expedition with which it can be done. The process is practically painless to the animal, and consists in removing the embryo horns ("the buttons") with a sharp knife, and then applying caustic potash. For this purpose,

the hair should be clipped from above or around the horn and then rubbing on the spot, wherever the latter has been removed, the moistened caustic potash for about a quarter of a minute. The stick of potash must

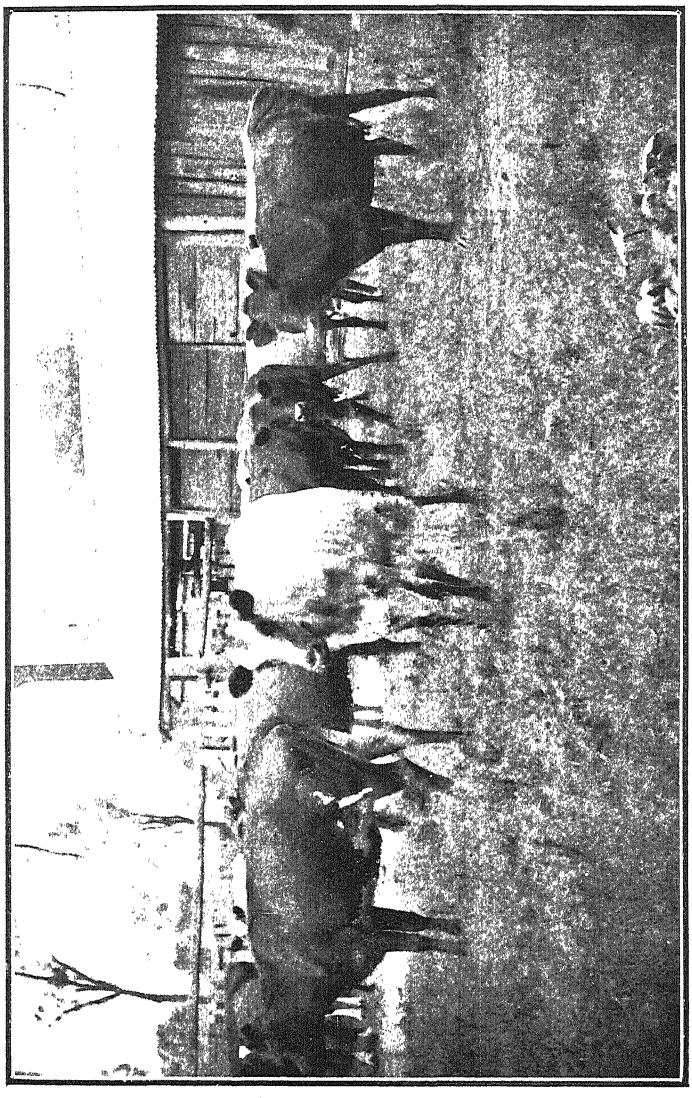


PLATE 9.—DEHORNED DAIRY HERD ON MR. R. L. BURN'S FARM, WONDAL.

not be moistened too much, or the caustic may spread to the skin and destroy the flesh. For the same reason, the calf should be kept from getting wet for some days after the operation.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JANUARY 28 TO FEBRUARY 27, 1917.

Seven thousand six hundred and thirty-eight eggs were laid during the period under review, an average of 104·5 per pen. Mr. J. R. Wilson wins the monthly prize with 147 eggs. The following are the individual records:—

| Competitors. | Breed. | Dec. | Total. |
|---|---|---|---|
| *Miss M. Hinze ... ... ... ... | White Leghorns ... | 135 | 1,417 |
| *T. Fanning ... ... ... ... | Do. ... ... | 140 | 1,417 |
| *J. Zahl ... ... ... ... ... | Do. ... ... | 105 | 1,406 |
| J. R. Wilson ... ... ... ... | Do. ... ... | 147 | 1,392 |
| *A. T. Coomber ... ... ... ... | Do. ... ... | 117 | 1,387 |
| W. Meneely ... ... ... ... | Do. ... ... | 124 | 1,384 |
| Geo. Tomlinson ... ... ... ... | Do. ... ... | 129 | 1,376 |
| G. H. Turner ... ... ... ... | Do. ... ... | 120 | 1,370 |
| *J. M. Manson ... ... ... ... | Do. ... ... | 102 | 1,368 |
| *E. A. Smith ... ... ... ... | Do. ... ... | 123 | 1,322 |
| A. Howe, N.S.W. ... ... ... | Do. ... ... | 103 | 1,317 |
| Dr. E. C. Jennings ... ... ... | Do. ... ... | 113 | 1,317 |
| *A. E. Walters ... ... ... ... | Do. ... ... | 120 | 1,314 |
| Mrs. Munro ... ... ... ... | Do. ... ... | 115 | 1,289 |
| J. M. Manson ... ... ... ... | Black Orpingtons ... | 104 | 1,279 |
| A. W. Bailey ... ... ... ... | White Leghorns ... | 120 | 1,278 |
| *W. H. Knowles, junr. ... ... ... | Do. ... ... | 141 | 1,276 |
| *E. F. Dennis ... ... ... ... | Do. ... ... | 83 | 1,270 |
| *J. H. Gill, Victoria ... ... ... | Do. ... ... | 122 | 1,269 |
| Mrs. W. D. Bradburne, N.S.W. ... | Do. ... ... | 100 | 1,266 |
| G. Prince ... ... ... ... | Do. ... ... | 110 | 1,261 |
| H. W. Broad ... ... ... ... | Do. ... ... | 113 | 1,251 |
| *Dixie Egg Plant ... ... ... | Do. ... ... | 88 | 1,248 |
| A. H. Padman, S.A. ... ... ... | Do. ... ... | 118 | 1,248 |
| T. Taylor ... ... ... ... ... | Do. ... ... | 101 | 1,247 |
| Cowan Bros., N.S.W. ... ... ... | Do. ... ... | 139 | 1,247 |
| *J. F. Dalrymple, N.S.W. ... ... | Rhode Island Reds ... | 112 | 1,240 |
| F. Clayton, N.S.W. ... ... ... | White Leghorns ... | 116 | 1,234 |
| E. Pocock ... ... ... ... ... | Do. ... ... | 103 | 1,231 |
| W. Lyell ... ... ... ... ... | Do. ... ... | 84 | 1,229 |
| T. E. Jarman, N.S.W. ... ... ... | Do. ... ... | 95 | 1,224 |
| *Mrs. J. H. Jobling, N.S.W. ... ... | Black Orpingtons ... | 97 | 1,224 |
| T. B. Hawkins ... ... ... ... | White Leghorns ... | 103 | 1,224 |
| *C. Knoblauch ... ... ... ... | Do. ... ... | 110 | 1,214 |
| W. Purvis, S.A. ... ... ... ... | Do. ... ... | 98 | 1,212 |
| P. Brodie ... ... ... ... ... | Do. ... ... | 97 | 1,210 |
| E. F. Dennis (five birds) ... ... | Black Orpingtons ... | 121 | 1,209 |
| R. Burns ... ... ... ... ... | S. L. Wyandottes ... | 109 | 1,207 |
| Kelvin Poultry Farm ... ... ... | White Leghorns ... | 72 | 1,202 |
| A. F. Camkin, N.S.W. ... ... ... | Do. ... ... | 96 | 1,196 |
| *E. West ... ... ... ... ... | Do. ... ... | 107 | 1,197 |
| King and Watson, N.S.W. ... ... | Do. ... ... | 119 | 1,195 |
| T. Fanning ... ... ... ... | Black Orpingtons ... | 113 | 1,193 |
| H. Jobling, N.S.W. ... ... ... | Do. ... ... | 104 | 1,185 |
| Mars Poultry Farm ... ... ... | White Leghorns ... | 81 | 1,185 |
| G. W. Holland ... ... ... ... | Do. ... ... | 125 | 1,183 |
| J. Anderson, Victoria ... ... ... | Do. ... ... | 77 | 1,171 |

## EGG-LAYING COMPETITION—*continued.*

| Competitors. | Breed. | Dec. | Total. |
|---|---|---|---|
| Cowan Bros., N.S.W. ... ... ... | Black Orpingtons ... | 99 | 1,167 |
| W. Becker... ... ... ... ... | White Leghorns ... | 99 | 1,160 |
| Mrs. C. Davis ... ... ... ... | Do. ... ... | 78 | 1,153 |
| A. Hirst, N.S.W. ... ... ... | Do. ... ... | 105 | 1,152 |
| Mars Poultry Farm ... ... ... | Black Orpingtons ... | 125 | 1,151 |
| *W. L. Forrest, N.S.W.... ... ... | Do. ... ... | 101 | 1,145 |
| J. G. Richter ... ... ... ... | Do. ... ... | 101 | 1,132 |
| *Kelvin Poultry Farm ... ... ... | Do. ... ... | 64 | 1,107 |
| H. Hammill, N.S.W. ... ... ... | Do. ... ... | 139 | 1,106 |
| *J. H. Madrers, N.S.W. ... ... | Rhode Island Reds ... | 117 | 1,100 |
| C. P. Buchanan ... ... ... ... | White Leghorns ... | 70 | 1,093 |
| Moritz Bros., S.A. ... ... ... | Do. ... ... | 124 | 1,092 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 89 | 1,091 |
| R. Burns ... ... ... ... ... | Black Orpingtons ... | 85 | 1,081 |
| S. B. Tutin ... ... ... ... | White Leghorns ... | 67 | 1,076 |
| *J. W. Macrae ... ... ... ... | Black Orpingtons ... | 98 | 1,075 |
| W. Lindus, N.S.W. ... ... ... | White Leghorns ... | 95 | 1,031 |
| Harveston Poultry Farm ... ... | Do. ... ... | 102 | 1,062 |
| F. W. Leney ... ... ... ... | Do. ... ... | 89 | 1,026 |
| J. Gosley ... ... ... ... ... | Do. ... ... | 74 | 1,025 |
| *J. Anderson, Victoria ... ... ... | Red Sussex ... ... | 96 | 1,020 |
| L. K. Pettit, N.S.W. ... ... ... | White Leghorns ... | 89 | 995 |
| A. T. Coomber ... ... ... ... | Sicilian Buttercups ... | 124 | 985 |
| W. H. Forsyth, N.S.W. ... ... | Black Orpingtons ... | 69 | 948 |
| F. W Leney ... ... ... ... | Rhode Island Reds ... | 67 | 896 |
| E. F. Dennis ... ... ... ... | White Wyandottes ... | 101 | 871 |
| Totals ... ... ... ... | ... | 7,638 | 87,321 |

* Indicates that the pen is taking part in single hen test.

## RESULTS OF SINGLE HEN TEST.

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| Miss M. Hinze ... ... ... | 242 | 214 | 266 | 218 | 247 | 230 | 1,417 |
| T. Fanning ... ... ... | 252 | 248 | 250 | 242 | 215 | 209 | 1,417 |
| J. Zahl ... ... ... ... | 235 | 251 | 216 | 239 | 242 | 223 | 1,406 |
| A. T. Coomber ... ... ... | 240 | 250 | 237 | 212 | 212 | 236 | 1,387 |
| J. M. Manson ... ... ... | 201 | 263 | 217 | 218 | 251 | 218 | 1,368 |
| E. A. Smith ... ... ... | 245 | 243 | 216 | 244 | 191 | 183 | 1,322 |
| A. E. Walters ... ... ... | 224 | 254 | 215 | 199 | 230 | 192 | 1,314 |
| W. H. Knowles, junr. ... ... | 201 | 208 | 216 | 188 | 239 | 224 | 1,276 |
| E. F. Dennis ... ... ... | 200 | 222 | 184 | 249 | 216 | 199 | 1,270 |
| J. H. Gill ... ... ... ... | 192 | 217 | 215 | 246 | 193 | 206 | 1,269 |
| Dixie Egg Plant ... ... ... | 269 | 248 | 245 | 246 | ... | 240 | 1,248 |
| J. F. Dalrymple ... ... ... | 191 | 211 | 225 | 174 | 243 | 196 | 1,240 |
| Mrs. J. H. Jobling ... ... | 192 | 254 | 188 | 201 | 187 | 202 | 1,224 |
| C. Knoblauch ... ... ... | 188 | 218 | 203 | 182 | 205 | 218 | 1,214 |
| E. West ... ... ... ... | 234 | 219 | 189 | 191 | 169 | 195 | 1,197 |
| W. L. Forrest ... ... ... | 232 | 229 | 54 | 180 | 234 | 216 | 1,145 |
| Kelvin Poultry Farm ... ... | 187 | 167 | 159 | 183 | 245 | 166 | 1,107 |
| J. H. Madrers ... ... ... | 144 | 211 | 216 | 203 | 165 | 161 | 1,100 |
| J. W. Macrae ... ... ... | 153 | 217 | 197 | 200 | 146 | 162 | 1,075 |
| J. Anderson ... ... ... | 192 | 166 | 213 | 102 | 196 | 151 | 1,020 |

# General Notes.

## THE RAW COTTON SUPPLY.

In December of last year, an important conference of the Council of the British Cotton-growing Association with representatives of the Lancashire cotton trade, to discuss the cotton situation, was held in Manchester. The proceedings were fully reported in "Cotton," the official journal of the Manchester Cotton Association, of 16th December. It was shown that the work of the association had passed the experimental stage, and it had proved that cotton of the requisite quality and in sufficient quantity can be grown in the Empire. The question now arose as to what further developments were to take place. The difficulties which the association now were involved in were the result of the success which had been attained; the 1916-17 cotton crop, produced under the auspices of the association, was expected to exceed 100,000 bales, worth £2,500,000, and there was every reason to anticipate increased quantities next year and the following years.

A few years ago the association decided to concentrate their efforts on the West Indies, the Sudan, Uganda, Nyasaland, and N.E. Rhodesia.

The association was started mainly to prove whether the cotton wanted by Great Britain could be grown in the Empire, and the council claimed that they had proved their case up to the hilt as far as both quality and quantity were concerned. It was now a question of time, capital, and management. The work of the association being practically completed, the question was, what was to be done in the future? The financial difficulty was already a very serious one. It was expected that at least 70,000 bales would have to be purchased and financed by the association, representing a value of £1,500,000, and the great difficulty in financing this cotton lay in the fact that so much of it had to be bought before any of it could be ginned, baled, and shipped; and consequently it could not be financed in the ordinary way. The association had arranged with their bankers for open overdrafts amounting to £500,000, but the banks were of the opinion that the association's liquid capital was not sufficient to justify them in asking for such assistance in future.

The association's capital was nearly £500,000, of which £170,000 had been spent in experimental work, and of the balance about £180,000 was locked up in plant, machinery, investments in cotton companies, &c., leaving only £150,000 liquid assets. The banks would, however, be quite prepared to find the association all the money required for financing cotton provided the Government would guarantee them against loss. Furthermore, the production of cotton had increased so rapidly in Nigeria that it was absolutely essential that another ginning factory should be sent out at once at a cost of about £25,000, and other ginning factories would also be required shortly. The association found that the

best way of developing the industry was to pay the native producer a good price for his cotton, and also to buy all the cotton he offers.

The council realised that the association were at the end of their resources; it was impossible for them to undertake any new proposition of any sort whatever; it was not possible for them to develop cotton-growing further.

As a result of the increase in the home consumption of American cotton—which had increased from 5,500,000 bales in 1913-14, 6,000,000 bales in 1914-15, to 7,250,000 bales in 1915-16, and in 1916-17 it would show a further increase—we had American cotton at 1s. per lb., and Egyptian cotton at 2s. per lb.*

There are many people who think that the cotton situation to-day is more than dangerous, and is a most serious matter for the future welfare of the whole country. If Lancashire really realised this, and would back up the council, the association proposed to approach the Government and insist that this was a matter which must be taken in hand at once. Everyone recognised that the country was at war, and that the main proposition to-day was the winning of the war, but there was no reason why the possibilities of the future should not be taken into consideration now.

As regarded the future, there seemed to be three alternatives—

(*a*) That a Government Department should be formed to take over the work of the association;

(*b*) That the association should be reconstructed as a public trust, with Government assistance and under Government control;

(*c*) That the work might be left to ordinary commercial enterprise.

During the palmy days of cotton-growing in Queensland, the acreage under this crop rose from 2,884 in 1866 to 14,674 in 1870, declining to 9,663 in 1873; and 26,000,000 lb. of ginned cotton were exported, worth £1,300,000. To stimulate the industry, the Government gave a bonus of £5 (later reduced to £2 10s.) on every 500-lb. bale of cotton exported. This enabled the ginowners to pay 3d. per lb. to the farmers for their seed cotton. With a crop of only 1,000 lb. of seed cotton per acre, the latter received £12 10s. per acre. The cost of production and marketing, if hired labour was employed, was £3 6s. 4d., and if the crop was picked, as it usually was, by farmers with families, the cost of picking, £2 1s. 8d., was retained in the family. What was done then can be done now, notwithstanding the higher rate of wages paid to-day, as was evidenced last year by the amounts paid by the Department of Agriculture for cotton purchased from the growers. Next season's crop will also be purchased by the Department at 1¾d. per lb., and a *pro ratâ* division of the profits on sale after ginning, and deduction of actual expenses for ginning, bailing, carriage, freight, &c.

* The total American cotton crop was set down by Messrs. Neill Bros., U.S.A., on 16th December, 1916, at 13,150,000 to 12,750,000 bales (and this included "linters"), but they made no change in their figures of the probable consumption of 14,750,000 bales.—Editor, "Q.A.J."

## FEEDING PIGS.

With reference to a statement concerning a feeding trial with pigs at Rothamsted, taken from the "London Live Stock Journal," and republished in the February issue of this Journal, Mr. A. J. Simpson, Mount Russell, New South Wales, writes:—

"It is a very well-known fact that the quantity of food required per 100 lb. of gain increases rapidly with the weight of the pigs. Experiments, especially valuable by reason of the large number of animals reported on, go to prove this." Our correspondent supplies the following interesting figures, which are the results of experiments made in Wisconsin, United States of America:—

| Average Weight. | Number of Pigs Fed. | Average Feed Eaten per Day. | Average Gain per Day. | Feed Eaten per 100 Lb. Gain. |
|---|---|---|---|---|
| Lb. | | Lb. | Lb. | Lb. |
| 38 | 174 | 2·23 | ·76 | 293 |
| 78 | 417 | 3·35 | ·83 | 400 |
| 128 | 495 | 4·79 | 1·10 | 437 |
| 174 | 300 | 5·91 | 1·24 | 482 |
| 226 | 223 | 6·57 | 1·36 | 498 |
| 271 | 105 | 7·40 | 1·46 | 511 |
| 320 | 36 | 7·50 | 1·40 | 535 |
| 378 | 36 | 5·52 | 1·98 | 431 |
| 429 | 18 | 8·18 | 1·71 | 479 |
| 471 | 18 | 10·00 | 1·77 | 562 |

"Feeding on meal," says Mr. Simpson, "I find that it requires about 310 lb. of meal per lb. of pork in pigs from 54 to 82 lb.; 375 lb. of meal per lb. of pork in pigs from 82 to 115 lb.; 438 lb. of meal per lb. of pork in pigs from 115 to 148 lb.; 455 lb. of meal per lb. of pork in pigs from 148 to 170 lb."

## SOCIETIES.

Aloomba.—Aloomba Farmers' Association. George Hesp, Secretary.

Beenleigh.—Beenleigh A. and P. Society. R. Newham, Secretary.

Charters Towers.—Charters Towers P. A. and M. Association. Show dates: 10th and 11th July, 1917.

Dalby.—Dalby Pastoralist and Agricultural Association. J. A. J. Hunter, Secretary.

Ipswich.—Ipswich Horticultural Society. S. H. Macartney and W. S. Johnston, Joint Secretaries.

Mackay.—Pioneer River Farmers and Graziers' Show Association. Show dates: 22nd and 23rd May, 1917.

Nambour.—Maroochy P. A. H. and I. Society. J. J. Wilkinson, Secretary.

Nambour.—Maroochy P. H. A. and I. Society. Show dates: 4th and 5th July, 1917.

Rockhampton.—Rockhampton Agricultural Society. Show dates: 21st, 22nd, and 23rd June.

Woolooga.—Woolooga and District Farmers' Progress Association. J. Chamberlain, Secretary.

Woombye.—North Coast Agricultural and Horticultural Society. E. E. McNall, Secretary. Show dates: 6th and 7th June, 1917.

Wowan.—Wowan Farmers' and Settlers' Progress Association. , Secretary.

## MR. J. F. BAILEY.

The Government Botanist, Mr. J. F. Bailey, who has for many years done excellent work as Director of the Brisbane Botanic Gardens, and later as Government Botanist, in succession to his late worthy father, has accepted an appointment as Curator of the Botanical Gardens in Adelaide. Mr. Bailey's grandfather was the creator of those beautiful gardens, and it goes without saying that the grandson will carry on the work with the same energy and scientific knowledge which he brought to bear on the beautiful Brisbane gardens. Whilst regretting Mr. Bailey's departure, we wish him every success in his new career.

## FISTULA.

When a fistula on withers is forming, it is customary to apply a blister or hot fomentations. This on rare occasions appears to effect a cure, but in the majority of cases it hastens the swelling and brings it to a head. After it has broken, surgical treatment is required.

The next thing is to find out the direction and depth of the fistula. This is done by using a flexible probe, some 8 or 9 in. in length. Free drainage must now be given by opening along the full length of the probe; or, if thought advisable, an opening can be made at the lower part of probe, and a seton of tape or other material passed through and tied on the outside. A seton keeps the wound open and assists in draining the cavity, but the first method of opening up is generally found more satisfactory. Both sides of the withers should be opened if necessary, and any necrosed (dead) tissue removed. The top of withers should not be opened crossways—from side to side—because there is a ligament which runs along the middle line of the shoulders from the head, which if cut causes serious consequences.

The chief points to remember are: Free drainage, the removal of all dead tissue, and the prevention of pockets where pus can accumulate.

The following lotion should be used every third day on the fistula after it has been opened up, until four applications have been applied:—Corrosive sublimate, ½ oz.; methylated spirit, 1 pint. This is best applied by soaking some cotton-wool or other absorbent material with the lotion, then packing the saturated cotton-wool in the fistula. This treatment can be repeated if necessary after ten or fourteen days' interval. Knives, probes, &c., should be thoroughly disinfected before using by placing them in boiling water or some disinfectant such as carbolic acid, Condy's Fluid, &c. Knives and other steel instruments should not be allowed to come in contact with the corrosive sublimate solution.

## "QUEENSLAND AGRICULTURAL JOURNAL," 1916.

Should any of our subscribers have any spare copies of the Journal for February, 1916, we would be obliged if they would forward them to this office, Department of Agriculture and Stock.

# Answers to Correspondents.

## MILCH GOATS.

J. H. TERSTEEG, Deeford—

1. The age to which a goat will live before ceasing to yield milk is about nine years.

2. There is no special breeding-place of milch goats in Queensland. The common goat is the best, Angoras being of little use for milk production.

3. The age of a goat may be ascertained in the same way as the age of the cow, the dentition being the same. At 5 years, full mouth with all incisors well up; at 2 years, 2 permanent incisors well up; at 3 years, 4 incisors; at 4 years, 6 incisors; at 5 years, 8 incisors well up. After that, broken mouth.

## MEASUREMENT OF AN EXCAVATED TANK.

"TANK" Mount Perry—

Your tank is shown on your plan as being 150 ft. square at the surface, 50 ft. square at the bottom, the depth being 20 ft. Multiply the length on the surface by the breadth. Thus: $150 \times 150 = 22,500$
Multiply the length by the breadth at the bottom $50 \times 50 = 2,500$
The middle section will be $100 \times 100$. Add 4 times the area of the middle section—*i.e.*, $100 \times 100 \times 4$ 40,000

65,000

Now multiply by 20 (the depth) $65,000 \times 20 = 1,300,000$. Divide this by $6 = 216,666\frac{2}{3}$ cubic feet. Then divide by 27 and you have the cubic yards 8,025, the content of the tank, equal to $1,354,166\frac{2}{3}$ gallons.

## KAPOK.

"KAPOK," N.C. Line—

You can obtain young plants of Kapok from Mr. C. F. Dennis, Hawthorne road, Bulimba. They can be planted out in the spring.

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## THE PRICE OF RENNET.

In our issue of February last we published an article on the cost of pepsin and rennet, which was supplied to us by the hon. secretary of the Queensland Committee of the Commonwealth Advisory Council of Science and Industry. The price of rennet is therein given as £4 15s. per gallon. Mr. H. W. Smith, manufacturing chemist, of Melbourne, has informed us that this is not correct, as he manufactures and sells Genuine Australian Extract of Calf Rennet at the wholesale price of £1 5s. per gallon. The retail price to cheesemakers would be about £1 10s. per gallon.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR FEBRUARY, 1917.

| Article. | | FEBRUARY. Prices. |
|---|---|---|
| Bacon | lb. | 9d. to 1s. |
| Barley | bush. | 4s. 3d. |
| Bran | ton | £5 15s. |
| Broom Millet | ,, | £18 to £23 |
| Butter | cwt. | 149s. 4d. |
| Chaff, Mixed | ton | £2 10s. to £4 |
| Chaff, Oaten | ,, | £4 10s. to £6 |
| Chaff, Lucerne | ,, | £3 to £3 5s. |
| Chaff, Wheaten | ,, | £4 10s. to £4 15s. |
| Cheese | lb. | 9d. to 9½d. |
| Flour | ton | £12 |
| Hams | lb. | 1s. 3d. to 1s. 4d. |
| Hay, Oaten | ton | £4 10s. |
| Hay, Lucerne | ,, | £2 to £2 10s. |
| Honey | lb. | 3d. |
| Maize | bush. | 2s. 6d. to 2s. 7½d. |
| Oats | ,, | 3s. to 4s. |
| Onions | ton | £7 10s. to £9 10s. |
| Peanuts | lb. | 3d. to 4½d. |
| Pollard | ton | £5 5s. |
| Potatoes | ,, | £4 to £6 |
| Potatoes (Sweet) | cwt. | 2s. to 2s. 6d. |
| Pumpkins (Cattle) | ton | £1 15s. to £2 |
| Eggs | doz. | 1s. 3d. to 1s. 10d. |
| Fowls | pair | 2s. 6d. to 3s. 9d. |
| Ducks, English | ,, | 3s. 9d. to 4s. |
| Ducks, Muscovy | ,, | 5s. 6d. to 6s. 6d |
| Geese | ,, | 7s. to 8s. 6d. |
| Turkeys (Hens) | ,, | 7s. 6d. to 9s. 6d. |
| Turkeys (Gobblers) | ,, | 16s. to 20s. |
| Wheat | bush. | 3s. 6d. to 3s. 9d. |

## VEGETABLES—TURBOT STREET MARKETS.

| | |
|---|---|
| Asparagus, per bundle | ... |
| Cabbages, per dozen | 1s. to 6s. 6d. |
| Cauliflowers, per dozen | ... |
| Celery, per bundle | ... |
| Cucumbers, per dozen | 3d. to 1s. |
| Beans, per sugar bag | 1s. to 2s. |
| Peas, per sugar bag | 4s. to 10s. |
| Carrots, per dozen bunches | 4d. to 9d. |
| Chocos, per quarter-case | 1s. 6d. to 2s. |
| Beetroot, per dozen bunches | 8d. to 9d. |
| Marrows, per dozen | 1s. to 3s. |
| Lettuce, per dozen | 4d. to 6d. |
| Parsnips, per dozen bunches | 9d. to 1s. 6d. |
| Sweet Potatoes, per sugar bag | 2s. to 2s. 3d. |
| Table Pumpkins, per dozen | 1s. 6d. to 2s. 6d. |
| Tomatoes, per quarter-case | 1s. to 2s. |
| Vegetable Marrows, per dozen | 1s. to 5s. |
| Turnips, per dozen bunches | ... |
| Rhubarb, per dozen bundles | 9d. |

## SOUTHERN FRUIT MARKETS.

| Article. | FEBRUARY. Prices. |
|---|---|
| Bananas (Queensland), per case | 5s. to 10s. |
| Bananas (Fiji), per case | 17s. 6d. to 19s. |
| Bananas (G.M.), per case | 19s. to 21s. |
| Custard Apples, per tray | ... |
| Lemons (Local), per bushel-case | 6s. to 10s. |
| Mandarins, per case | ... |
| Mangoes, per bushel-case | 6s. to 8s. |
| Oranges (Navel), per case | ... |
| Oranges (other), per case | 5s. to 7s. |
| Pears, per case | ... |
| Papaw Apples, per half-bushel case | 3s. to 7s. |
| Passion Fruit, per half-case | 1s. 6d. to 4s. |
| Persimmons, per half-case | ... |
| Pineapples (Queens), per double-case | 3s. to 6s. |
| Pineapples (Ripleys), per double-case | 3s. to 5s. |
| Pineapples (Common), per double-case | 3s. to 5s. |
| Strawberries (Local), per dozen punnets* | 16s. to 18s. |
| Tomatoes (Queensland), per half-bushel-case | 2s. to 5s. |

* 1 punnet = 1 quart.

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | FEBRUARY. Prices. |
|---|---|
| Apples, Eating, per case | 6s. to 8s. 6d. |
| Apples, Cooking, per case | 3s. to 6s. 6d. |
| Bananas (Cavendish), per dozen | 1d. to 2d. |
| Bananas (Sugar), per dozen | 1d. to 2½d. |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per quarter-case | 3s. 6d. to 4s. 9d. |
| Custard Apples, per quarter-case | ... |
| Granadillas, per quarter-case | ... |
| Grapes, per lb. | 3d. to 4d. |
| Lemons (Lisbon), per quarter-case | 2s. 6d. to 4s. |
| Limes, per quarter-case | 3s. to 4s. 6d. |
| Mandarins, per quarter-case | 6s. to 8s. |
| Mangoes, per case | 2s. to 3s. |
| Nectarines, per case | 2s. to 3s. |
| Oranges (Navel), per case | 15s. |
| Oranges (other), per case | 4s. 6d. to 5s. |
| Papaw Apples, per case | 9d. to 1s. |
| Passion Fruit, per quarter-case | 1s. 6d. to 4s. |
| Peaches, per quarter-case | 1s. 6d. to 4s. |
| Pears, per quarter-case | 2s. to 3s. 6d. |
| Peanuts, per lb. | 3d. to 4½d. |
| Persimmons, per quarter-case | 1s. 6d. to 2s. |
| Plums (light), per quarter-case | 1s. to 1s. 6d. |
| Plums (prime eating), per case | 3s. to 4s. 6d. |
| Pineapples (Ripleys), per dozen | 1s. to 2s. |
| Pineapples (Rough), per dozen | 4d. to 1s. 6d. |
| Pineapples (Smooth), per dozen | 1s. 6d. to 2s. |
| Quinces, per quarter-case | 2s. 6d. |
| Rockmelons, per dozen | ... |
| Strawberries, per dozen boxes | ... |
| Tomatoes, per quarter-case | 1s. to 2s. |
| Watermelons, per dozen | 2s. 6d. to 7s. |

## TOP PRICES, ENOGGERA YARDS, JANUARY, 1917.

| Animal. | JANUARY. Prices. |
|---|---|
| Bullocks ... ... ... ... ... ... ... ... | £17 10s. to £22 10s. |
| Bullocks (Single) .. ... ... ... ... ... | £24 10s. |
| Cows ... ... ... ... ... ... ... ... | £12 2s. 6d. to £16 |
| Merino Wethers ... ... ... ... ... ... ... | 34s. |
| Crossbred Wethers ... ... ... ... ... ... | 36s. 9d. |
| Merino Ewes ... ... ... ... ... .. ... | 27s. 9d. |
| Crossbred Ewes ... ... ... ... ... ... ... | 32s. 6d. |
| Lambs ... ... ... ... ... ... ... ... | 30s. 3d. |
| Pigs (Porkers) ... ... ... ... ... ... ... | 60s. |

## ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

### TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON

On account of the alteration of Civil (Clock) Time which took place on 1st January, it is necessary to *add one hour* to all the times given on this page till the last Sunday in March.

| 1917. | JANUARY. | | FEBRUARY. | | MARCH. | | APRIL. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 4·57 | 6·46 | 5·21 | 6·41 | 5·41 | 6·19 | 5·58 | 5·46 |
| 2 | 4·58 | 6·46 | 5·22 | 6·41 | 5·41 | 6·18 | 5·59 | 5·45 |
| 3 | 4·59 | 6·46 | 5·23 | 6·40 | 5·42 | 6·17 | 5·59 | 5·44 |
| 4 | 4·59 | 6·46 | 5·24 | 6·40 | 5·43 | 6·16 | 6·0 | 5·43 |
| 5 | 5·0 | 6·46 | 5·25 | 6·39 | 5·44 | 6·15 | 6·0 | 5·42 |
| 6 | 5·1 | 6·47 | 5·25 | 6·39 | 5·45 | 6·14 | 6·1 | 5·41 |
| 7 | 5·2 | 6·47 | 5·26 | 6·38 | 5·45 | 6·13 | 6·1 | 5·39 |
| 8 | 5·3 | 6·47 | 5·27 | 6·37 | 5·46 | 6·12 | 6·2 | 5·38 |
| 9 | 5·3 | 6·47 | 5·28 | 6·36 | 5·46 | 6·11 | 6·2 | 5·37 |
| 10 | 5·4 | 6·48 | 5·29 | 6·35 | 5·47 | 6·10 | 6·3 | 5·36 |
| 11 | 5·5 | 6·48 | 5·29 | 6·35 | 5·47 | 6·9 | 6·3 | 5·35 |
| 12 | 5·6 | 6·47 | 5·30 | 6·34 | 5·48 | 6·8 | 6·4 | 5·34 |
| 13 | 5·6 | 6·47 | 5·31 | 6·33 | 5·48 | 6·7 | 6·4 | 5·33 |
| 14 | 5·7 | 6·47 | 5·32 | 6·32 | 5·49 | 6·6 | 6·5 | 5·32 |
| 15 | 5·8 | 6·47 | 5·32 | 6·32 | 5·49 | 6·5 | 6·5 | 5·31 |
| 16 | 5·9 | 6·47 | 5·33 | 6·31 | 5·50 | 6·3 | 6·6 | 5·30 |
| 17 | 5·9 | 6·47 | 5·34 | 6·30 | 5·50 | 6·2 | 6·6 | 5·29 |
| 18 | 5·10 | 6·47 | 5·35 | 6·29 | 5·51 | 6·1 | 6·7 | 5·28 |
| 19 | 5·11 | 6·47 | 5·35 | 6·28 | 5·51 | 6·0 | 6·7 | 5·27 |
| 20 | 5·12 | 6·46 | 5·36 | 6·28 | 5·52 | 5·59 | 6·8 | 5·26 |
| 21 | 5·13 | 6·46 | 5·37 | 6·27 | 5·52 | 5·58 | 6·8 | 5·25 |
| 22 | 5·13 | 6·46 | 5·37 | 6·26 | 5·53 | 5·57 | 6·8 | 5·24 |
| 23 | 5·14 | 6·45 | 5·38 | 6·25 | 5·53 | 5·56 | 6·9 | 5·23 |
| 24 | 5·15 | 6·45 | 5·38 | 6·24 | 5·54 | 5·55 | 6·9 | 5·23 |
| 25 | 5·16 | 6·45 | 5·39 | 6·23 | 5·54 | 5·54 | 6·10 | 5·22 |
| 26 | 5·16 | 6·44 | 5·39 | 6·22 | 5·55 | 5·52 | 6·10 | 5·21 |
| 27 | 5·17 | 6·44 | 5·40 | 6·21 | 5·55 | 5·51 | 6·11 | 5·20 |
| 28 | 5·18 | 6·43 | 5·40 | 6·20 | 5·56 | 5·50 | 6·11 | 5·19 |
| 29 | 5·19 | 6·43 | ... | ... | 5·57 | 5·49 | 6·12 | 5·18 |
| 30 | 5·19 | 6·42 | ... | ... | 5·57 | 5·48 | 6·12 | 5·18 |
| 31 | 5·20 | 6·42 | ... | .. | 5·58 | 5·47 | ... | ... |

The Phases of the Moon commence at the times stated in Queensland, New South Wales, and Victoria only.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 8 | Jan., | ○ Full Moon | 5 | 42 | p.m. |
| 16 | ,, | ☽ Last Quarter | 9 | 42 | ,, |
| 23 | ,, | ● New Moon | 5 | 40 | ,, |
| 30 | ,, | ☾ First Quarter | 11 | 1 | a.m. |

There will be a total eclipse of the moon on 8th Jan. before it rises in Queensland, but the moon will still be partly in the shadow of the earth for about three-quarters of an hour after it becomes visible. It will be farthest from the earth on the 9th January, and nearest on the 23rd.

| | | | | | |
|---|---|---|---|---|---|
| 7 | Feb., | ○ Full Moon | 1 | 28 | p.m. |
| 15 | ,, | ☽ Last Quarter | 11 | 53 | a.m. |
| 22 | ,, | ● New Moon | 4 | 9 | ,, |

It will be farthest from the earth on the 6th Feb., and nearest on the 21st.

| | | | | | |
|---|---|---|---|---|---|
| 1 | Mar. | ☾ First Quarter | 2 | 43 | a.m. |
| 9 | ,, | ○ Full Moon | 7 | 58 | ,, |
| 16 | ,, | ☽ Last Quarter | 10 | 33 | p.m. |
| 23 | ,, | ● New Moon | 2 | 5 | ,, |
| 30 | ,, | ☾ First Quarter | 8 | 36 | ,, |

It will be farthest from the earth on the 5th about midnight, and nearest on the 21st about 7 p.m

| | | | | | |
|---|---|---|---|---|---|
| 7 | Apr. | ○ Full Moon | 11 | 49 | p.m. |
| 15 | ,, | ☽ Last Quarter | 6 | 12 | a.m. |
| 22 | ,, | ● New Moon | 12 | 1 | ,, |
| 29 | ,, | ☾ First Quarter | 3 | 22 | p.m. |

It will be farthest from the earth on the 2nd and on the 30th, and nearest on the 18th.

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JANUARY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JANUARY, 1917 AND 1916, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | Jan. | No. of Years' Records. | Jan., 1917. | Jan., 1916. |
| *North Coast.* | In. | | In. | In. |
| Atherton ... ... | 13·63 | 15 | 3·75 | 7·64 |
| Cairns ... ... | 17·17 | 34 | 5·57 | 32·01 |
| Cardwell ... ... | 17·24 | 44 | 10·01 | 19·90 |
| Cooktown ... ... | 15·32 | 40 | 7·23 | 16·33 |
| Herberton ... ... | 10·02 | 29 | 6·78 | 5·50 |
| Ingham ... .. | 16·84 | 24 | 11·02 | 21·08 |
| Innisfail ... ... | 21·83 | 35 | 10·31 | 22·33 |
| Mossman ... ... | 16·75 | 1 | 6·21 | 21·66 |
| Townsville ... ... | 11·52 | 45 | 20·97 | 9·89 |
| *Central Coast.* | | | | |
| Ayr ... ... ... | 11·70 | 29 | 21·80 | 5·66 |
| Bowen ... ... | 9·59 | 45 | 12·76 | 7·76 |
| Charters Towers .. | 5·53 | 34 | 14·72 | 1·85 |
| Mackay ... ... | 14·02 | 45 | 10·26 | 9·25 |
| Proserpine ... ... | 16·37 | 13 | 19·95 | 8·71 |
| St. Lawrence ... | 9·38 | 45 | 4·28 | 0·41 |
| *South Coast.* | | | | |
| Biggenden ... ... | 5·51 | 17 | * | 0·76 |
| Bundaberg ... .. | 9·45 | 33 | 9·05 | 1·30 |
| Brisbane ... ... | 6·49 | 66 | 9·07 | 2·34 |
| Childers ... ... | 8·37 | 21 | 5·28 | 1·39 |
| Crohamhurst ... | 13·28 | 23 | 10·32 | 3·71 |
| Esk ... ... ... | 5·69 | 29 | 7·01 | 1·54 |
| Gayndah ... ... | 4·84 | 45 | 6·77 | 0·60 |
| Gympie ... ... | 6·75 | 46 | 4·48 | 4·02 |
| Glasshouse M'tains | 9·43 | 8 | 7·56 | 3·48 |
| Kilkivan ... ... | 5·76 | 37 | 4·27 | 1·68 |
| Maryborough ... | 7·46 | 45 | 5·90 | 1·82 |

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | Jan. | No. of Years' Records. | Jan., 1917. | Jan., 1916. |
| *South Coast*—continued: | In. | | In. | In. |
| Nambour ... ... | 9·41 | 20 | 5·43 | 4·03 |
| Nanango ... ... | 4·52 | 34 | 7·98 | 2·36 |
| Rockhampton ... | 9·05 | 29 | 5·27 | 0·39 |
| Woodford ... ... | 7·13 | 29 | 9·90 | 4·42 |
| *Darling Downs.* | | | | |
| Dalby ... ... | 3·28 | 46 | 3·64 | 3·59 |
| Emu Vale ... ... | 3·25 | 20 | 5·09 | 2·25 |
| Jimbour ... ... | 3·88 | 28 | 4·01 | 2·20 |
| Miles ... ... | 3·99 | 31 | 3·72 | 3·52 |
| Stanthorpe ... | 3·70 | 43 | 3·20 | 3·39 |
| Toowoomba ... | 5·12 | 44 | 4·76 | 1·70 |
| Warwick ... ... | 3·73 | 29 | 3·90 | 2·77 |
| *Maranoa.* | | | | |
| Roma ... ... | 3·44 | 32 | 3·01 | 1·67 |
| *State Farms, &c.* | | | | |
| Bungeworgorai ... | 1·08 | 4 | 2·58 | 0·55 |
| Gatton College ... | 4·43 | 17 | 4·81 | 2·04 |
| Gindie ... ... | 3·28 | 17 | 4·50 | 2·37 |
| Hermitage ... | 2·76 | 10 | 4·50 | 2·99 |
| Kairi ... ... | 7·29 | 4 | 4·06 | 10·08 |
| Kamerunga ... | 18·41 | 26 | 3·60 | 32·15 |
| Sugar Experiment Station, Mackay | 14·82 | 19 | 11·80 | 7·56 |
| Warren ... ... | 2·08 | 4 | 5·33 | 0·16 |

* Incomplete.

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for January this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
Divisional Officer.

# Farm and Garden Notes for April.

FIELD.—The wheat land should now be ready for sowing the early wheats, and that which has not been prepared should be ploughed without delay, April, May, and June at latest being the months for sowing. The main potato crop, planted in February and March, will be ready for a first or second hilling up. The last of the maize will have been got in. Where cotton is grown, the pods will now be opening, and advantage should be taken of dry weather to get on with the picking as quickly as possible. Picking should not be begun until the night dew has evaporated nor during rain. Sorghum seed will be ripe. Tobacco also will be ripening, and either the leaves or the whole plant harvested. Lucerne may be sown, as the growth of weeds has now slacked off, but the ground must be thoroughly prepared and cleaned. Sow oats, barley, rye, wheat, mangolds, and Swede turnips. Plant out paspalum roots. Seed wheat of whatever variety soever should be dipped in a solution of sulphate of copper (bluestone) in the proportion of 1 lb. of sulphate to 24 gallons of water. The seed may also be treated with hot water by plunging it in a bag into hot water at 120 degrees Fahr. for a minute or two, and then into water heated to 135 degrees Fahr. Allow it to remain in this for ten minutes, moving it about all the time. Then plunge the seed into cold water and spread out to dry. This plan is useful in districts where bluestone may not be obtainable. Another safeguard against bunt, smut, black and red rust is to treat the seed with formalin at the rate of 1 lb. of formalin to 40 gallons of water. Schering's formalin costs about 2s. 10d. per lb., and is sold in bottles. It is colourless and poisonous, and should be kept where no children or persons ignorant of its nature can have a chance of obtaining it. To treat the seed, spread it on a wooden floor and sprinkle the solution over it, turning the grain over and over until the whole is thoroughly wetted. Then spread it out to dry, when it will be ready for sowing. Intsead of sprinkling, dipping may be resorted to. A bushel or so of seed is placed in a bag and dipped in the solution. During five minutes the bag is plunged in and out, and then the seed is turned out to dry. Formalin is less injurious to the grain than bluestone, but, while the latter can be used over and over again, formalin becomes exhausted. It therefore follows that only the amount required for immediate use for sprinkling should be prepared. Do not sow wheat too thickly. Half a bushel to the acre is sufficient—more on poor land and less on rich soils. On light, sandy soil the wheat should be rolled. On sticky land it should only be rolled when the land is dry, otherwise it will cake, and must be harrowed again after rolling. When the wheat is 6 in. high go over it with light harrows. If the autumn and winter should prove mild and the wheat should lodge, it should be kept in check by feeding it off with sheep.

KITCHEN GARDEN.—Hoe continually among the crops to keep them clean, and have beds well dug and manured, as recommended last month, for transplanting the various vegetables now coming on. Thin out all

crops which are overcrowded. Divide and plant out pot-herbs, giving a little water if required till established. Sow broad beans, peas, onions, radish, mustard and cress, and all vegetable seeds generally except cucumbers, marrows, and pumpkins. Early celery should be earthed up in dry weather, taking care that no soil gets between the leaves. Transplant cauliflowers and cabbages, and keep on hand a supply of tobacco waste, preferably in the form of powder. A ring of this round the plants will effectually keep off slugs.

FLOWER GARDEN.—The operations this month will depend greatly on the weather. If wet, both planting and transplanting may be done at the same time. Camellias, gardenias, &c., may be removed with safety. Plant out all soft-wooded plants such as verbenas, petunias, pentstemons, &c. Sow annuals, as carnations, pansy, mignonette, daisy, snapdragon, dianthus, stocks, candytuft, phlox, sweet peas, &c. Those already up must be pricked out into other beds or into their permanent positions. Growth just now will not be too luxuriant, and shrubs and creepers may be shortened back. Always dig the flower beds rough at first, then apply manure, dig it in, and after this get the soil into fine tilth. Land on which you wish to raise really fine flowers should have a dressing of bonedust lightly turned in. Wood ashes also form an excellent dressing for the garden soil. Prune out roses. These may be planted out now with perfect success. Take up dahlia roots, and plant bulbs as recommended for March. Layers that have made sufficient roots should now be gradually severed from the plant, and left for a fortnight before potting, to ripen the young roots.

# Orchard Notes for April.

## THE SOUTHERN COAST DISTRICTS.

The gathering and marketing of citrus fruit, as well as of pines, bananas, custard apples, persimmons, &c., is the principal work of the month. In the Notes for March attention was drawn to the necessity for keeping all pests in check, particularly those attacking the ripening fruit. As it is the height of folly to look after the orchard thoroughly during the growing period of the crop and then to neglect the crop when grown, every possible care must be taken to keep fruit fly, peach moth, black brand, or other pests that destroy or disfigure the fruit in check, and this can only be accomplished by combined and systematic action. Citrus fruit at this time of the year often carries badly, as the stem is tender, easily bruised, full of moisture, and, consequently, very liable to the attacks of the blue mould fungus, which causes speckling. The loss from this cause can be lessened to a considerable extent by carefully attending to the following particulars:—

1st. Never allow mouldy fruit to hang on the trees or to lie about on the ground. It should be gathered and destroyed, so that the countless spores which are produced by the fungus shall

not be distributed broadcast throughout the orchard, infesting many fruit, and only waiting for a favourable opportunity, such as an injury to the skin by an insect or otherwise, combined with favourable weather conditions (heat and moisture), to start into growth.

2nd. Handle the fruit carefully to prevent bruising. Cut the fruit, don't pull it, as pulling is apt to plug the fruit—that is to say, to either pull the stem out or injure the skin round the stem—and a fruit so injured will go mouldy.

3rd. Sweat or dry the fruit thoroughly; if the weather is humid, laying the fruit out in the sun on boards or slabs is a very good plan.

4th. After sweating, examine the fruit carefully, and cull out all bruised or punctured fruit, and only pack perfectly sound dry fruit. It is better for the loss to take place in the orchard than for the loss to take place in the case in transit.

5th. If the mould is very bad, try dipping the fruit for a few seconds in a 2 per cent. solution of formalin. This will kill the spores, and if the fruit is placed in the sun and dried quickly before packing there will not be much chance of its becoming reinfested.

Don't gather the fruit too green, especially such varieties as the Beauty of Glen Retreat mandarins, as immature fruit spoils the sale of the good article.

If the orchard has not been cleaned up after the summer rains, do so now; and do any other odd jobs that may be required, such as mending fences, grubbing out dead or worthless trees, cleaning out drains, &c.

Strawberry planting may be continued, and where new orchards are to be planted continue to work the soil so as to get it into the best possible tilth.

## THE TROPICAL COAST DISTRICTS.

Clean up the orchards after the rainy season. Look out for scale insects, and cyanide or spray for same when necessary.

Go over the trees carefully, and when there is dead wood or water sprouts remove them. If bark fungus is showing, paint the affected branches with sulphur and lime wash. Clean up bananas, pineapples, and other fruits, as after the end of the month it is probable that there will not be any great rainfall, so that it is advisable to keep the ground well cultivated and free from weeds, so as to retain in the soil the moisture required for the trees' use during the winter months. Keep bananas netted; destroy guavas wherever found.

## THE SOUTHERN AND CENTRAL TABLELANDS.

If the orchards and vineyards have not already been cleaned up, do so. Cultivate or plough the orchard, so as to get the surface soil into good tilth, so that it can absorb and retain any rain that falls, as, even though the trees will simply be hardening off their summer's growth of wood, it is not advisable to let the ground dry out. When citrus fruits are grown, attend to them in the manner recommended for the Southern Coast Districts; and, when grown in the dry parts, keep the land in a state of good cultivation. Should the trees require it, a light watering may be given. Do not irrigate vines; let them ripen off their wood.

# Queensland Agricultural College.

## FOR SALE.

Grass Roots, Rhodes and Paspalum, are obtainable at 2s. 6d. per sack, f.o.b. Gatton.

There are no farm seeds for disposal at the College.

## POULTRY.

The following breeds are available:—Brown Leghorn, White Leghorn, Indian Game, Black Orpington, Silver-Laced Wyandotte, Rhode Island Reds. In last-named breed, no birds will be available this year, and only a limited number of eggs at 21s. per setting f.o.b.

**Prices:**

Cockerels—10s., 15s., and 21s.
Pairs—Cockerel and Pullet, 30s. and 42s.
Trios—Cockerel and two Pullets, 42s. and 63s.
} f.o.b. Gatton.

Prices vary according to quality. Unless crates are returned promptly, an extra charge of 2s. for a single bird and 1s. for each additional bird will be incurred.

Settings of eggs of the above breeds are available from 1st July up to 30th November Price, 10s. per setting, f.o.b. Gatton. Nine eggs in each setting guaranteed fertile. Should less than nine prove to be fertile, the infertiles will be replaced, if returned, carriage paid and unbroken.

(N.B.—An infertile egg is uniformly translucent when held up to a strong light. Settings should be allowed to settle twenty-four hours before being placed under the hen.)

**IMPORTED JERSEY BULL**—Star Turn, 718 Q.J.H.B. Calved 5th August, 1913. Sire, Self Acting (4674). Dam, Solid Star (15934). Bred by Elias Cabot, St. Clements, Jersey Island.

**IMPORTED AYRSHIRE BULL**—Netherton King George (8181). Calved 9th December, 1909. Sire, Netherton King Arthur (7431). Dam, Midlands Young Greenfield (22621). Bred by Thomas Clements, Netherton, Newton Mearns, Scotland.

**IMPORTED HOLSTEIN BULL**—Froxfield Dairyman (12611). Calved 26th March, 1912. Sire, Froxfield Duke Bob (155). Dam, Froxfield Doris (1150). Bred by J. F. N. Baxendale.

**Ayrshire Bulls.**

No. 165. Sire, Stewart of Wanora. Dam, Lucinda. Date calved, 14th October, 1915. Price, £15 15s.

No. 177. Sire, Stewart of Wanora. Dam, Constancy. Date calved, 24th November, 1915. Price, £10.

**Jersey Bulls.**

All cattle sold accompanied by pedigree.

**Pigs.**

"Gatton Dandy Dick," by imported stock, Reg. B.H.B. of A., 18 months old. Price, £8 8s.

Orders will be received for Yorkshire boars and sows, from 2 to 3 months old, at £2 10s. each.

All prices—F.O.B. Gatton.

## FOR SERVICE.

CLYDESDALE STALLION—**Lord Cellus** (imp.).
Service fee, £3 3s. per mare and 1s. 6d. per week agistment.

AYRSHIRE BULLS—**Netherton King George** (imp.).
**Stewart of Wanora.**

JERSEY BULLS—**Star Turn** (imp.).
Service fee, 10s. per cow; agistment, 1s. per week.

CUTHBERT POTTS, Principal.

QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## AGRICULTURAL EDUCATION FOR WOMEN.

For a long series of years the emancipation of women from their centuries of long exclusion from any but household duties has been advocated by far-seeing leaders of the movement in all countries of the world. In many European countries the peasant farmer's wife and daughters were obliged to assist in various ways in the field, in the stall, and in carrying the produce to market, in addition to attending to household affairs.

It has remained for the present European war to bring women's work more in line with that of men in many ways which would never have been dreamt of four years ago. No longer do parents think it degrading to let their daughters attend to the orchard, the dairy, poultry yard, or apiary. It has been found that women are capable also of very strenuous work in foundries, munition factories, as well as on the farm and market garden. They have largely taken the places of men who have joined the army in such capacities as railway porters, tram and omnibus conductors, letter-carriers, and are engaged in a host of employments which previously were considered to be only fit for strong men and lads. Nor is this now universal employment differentiated by rank and position in life. Ladies of high social standing are now working like their sisters in less fortunate circumstances in factories, laundries, warehouses; in the field; on the roads; in all sorts of employment—all working long hours, in many cases as much as twelve hours a day, and that often for seven days in the week. Thus has been, once for all,

exploded the theory that women are not fitted for any but household employment.

Here is an example of what the women of England are doing at this time of writing:—"The Devon Women's Agricultural War Committee organised a ploughing and agricultural demonstration for women at Ketterton, Exeter, England, which was attended by a large concourse. There were nearly 100 competitors for prizes in ploughing, rolling, harrowing, milking, sheep-shearing, harnessing, &c. The champion ploughing prize was won by a girl only fifteen years of age. The sheep-shearing was pronounced by the judges to be remarkably well done, many farm men being unable to do as well."

In the year 1900 the Russian Imperial Society for the Development of Agricultural Education took the matter in hand at the National Congress held at Moscow. From all parts of the Empire there was a cry for ladies with an agricultural education. The head of the movement was Professor Stebut, and he met with enthusiastic support amongst Russian women. In many places private ladies established schools of rural and domestic economy for ladies. The peasant girls are being taught vegetable and fruit growing, rural economy, and agriculture. The more highly educated women undergo a three years' curriculum:—First year: Cattle-rearing, dairying, butter-making, and cheesemaking, swine rearing and feeding, poultry-farming, gardening, vegetable and fruit growing, horticulture, washing and ironing, spinning and weaving, sheep rearing and feeding, cutting up killed meat, the preparation of simple and of more complicated food; candle, soap, and starch making; jams, jellies, and preserved fruits, &c.; beekeeping; reading, writing, bookkeeping, and two languages. Second year: Mother tongue, letter-writing, bookkeeping, elements of hygiene, first aid in case of accidents, nursing the sick and wounded, elements of veterinary medicine, linen washing and ironing, salting and smoking of meat, &c., &c.

Ladies efficient in the above subjects complete their technical education by getting lessons in growing ornamental trees and in landscape gardening, botany, zoology, chemistry, mineralogy, and drawing. All those theoretical subjects are accompanied by practical work and demonstrations.

At the expiration of three years the pupils are severely examined, and if found efficient they receive a diploma to that effect. The fees are £20 per annum, which includes board, residence, and tuition.

Since the date mentioned the agricultural education of women has made great strides. It needs only a glance at the illustrated British journals to show how women of all classes have thrown themselves heart and soul into industrial work; and it is largely due to the self-denying work of these noble women that both British and their Allies have received the vast quantities of shells, machine guns, &c., which have enabled them to continually press forward towards the great objective—the destruction of German militarism and the freedom of Belgium, Northern France, and Alsace-Lorraine from the brutal rule of the Hun.

The women of Australia are also doing their utmost towards the same end, and all classes have vied with their sisters overseas in providing every possible thing for the alleviation of the labours and sufferings of those heroic Australian soldiers who are so gallantly fighting for not only Britain and her Allies, but for the salvation of Australia; for, if Germany should win in this war, then would Australia be practically enslaved, and the German would crush the hated Australian British with an iron hand.

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## ONION-GROWING.

The next two months are the most favourable for getting the seed in, so as to harvest the crop about the end of the year. To be successful with this crop it is necessary that the land proposed to be planted out, as well as the seed-bed, be turned up and exposed to the weather some months ahead of planting. If this is done, and frequent stirring made, most of the weed seeds will be induced to germinate, when complete destruction will be easy. The common practice of ploughing and putting the land in order just previous to planting cannot be too strongly condemned in onion culture, as weeds will cause endless trouble and expense. Getting the land into good order includes well rolling it, for an indispensable cultural condition for onions is to get the soil well firmed underneath without "panning" it. This condition is often lost sight of. If the soil is carefully worked, reduced to a fine tilth, and the plants are set out in a soil which has been loosened to a depth of, perhaps, 8 in., no good results can be expected without rolling. The onion requires a firm bed; otherwise the plant, instead of making a large, well-shaped bulb, will run to "neck," and have more the appearance of a leek than an onion.

The most suitable soil is a rich sandy loam, free, friable, and easy to work—a soil that will not cake, and not lying so low as to retain the superabundant moisture after heavy rains. In the latter case, the land should be well drained. An eastern or south-eastern aspect has been proved to be better than if the land sloped to the west, as the onion does not require intense heat to bring it to perfection.

The best way to sow onions is to drill them in, although for small areas the seed may be sown in a seed bed and the young seedlings planted out. The drills should be from 8 in. to 15 in. apart, which will require from 2 lb. to 10 lb. of seed per acre. The seed should be dropped at a distance of 2 in. to 3 in. apart in the drills, and the plants will afterwards be required to be thinned out with the hoe to 6 in. apart in rich land. The drills should be slightly raised, and the *roots* of the plants be firmly embedded in them. The *bulb* is not the *root*, and it should be allowed, so to speak, to squat *on* the surface, not *under* it.

When sowing the seed, it need only be put just under the ground, as it requires but a very slight covering of soil. If sown deep, many seeds fail to germinate, and most of those that do appear will make an

abnormal growth of neck, causing much labour in drawing away the soil from the incipient bulbs. There are few seeds so annoyingly deceptive as onion seeds, as old seed loses its germinating power, and imported seed, unless carefully packed in airtight bottles or soldered tins, will scarcely germinate at all. Therefore, it is well to make sure of getting new seed. After sowing, germination should take place in about a week, and the onion comes to maturity in from 120 to 180 days (spring onions in from 60 to 90 days). As the plant grows, the soil must be kept perfectly clear of weeds; and where the working of the ground has thrown the soil against the bulbs, it must be drawn down so that only the roots are in the ground. Where this has not been attended to, the remedy for the resulting want of bulb-formation is to wring the necks of the plants, or, at least, to bend them down with a twist. This will have the effect of inducing the formation of bulbs. Onions may be known to be ripe by the drying up of the tops. As soon as this happens pulling should be done quickly, because, if wet should come on, the bulbs may start a fresh root action. This, besides making them harder to pull, will seriously impair their quality. After they are pulled, the onions are left in narrow "windrows" to get well dried and ripened, and may then be removed to a dry barn, subject to a free current of air. Should they show any sign of heating, they must be at once turned over, and the bad ones picked out. The best varieties for our Queensland climate are Mammoth Silver King, Brown Spanish, Brown Globe, Yellow Globe, and Silver Skin. For spring onions sow White Tripoli in drills about 9 or 10 in. apart. Beyond a little hoeing in summer, they require no attention.

Sometimes the crop suffers from the ravages of a green grub which is numerous in some soils, especially in badly tilled ground. These come forth at night, and cut the young plants off level with the surface. One of the best preventives is to use the hoe frequently, by which means the green grubs, wire worms, &c., are brought to the surface in view of birds, which soon destroy them.

Thrips are a small, pale-green, elongated insect, belonging to the family of fringe-winged flies, which bite the plants, leaving small white specks on the foliage. On tearing the foliage open, minute green elongated insects are found. These are thrips. The onion being a very delicate plant, the sprays used on fruit trees cannot be employed. Roughly cured tobacco leaves made into a decoction of 1 lb. of tobacco in 2 gallons diluted to 4 gallons for use, with a little soap or molasses added to make it adhere to the plants, may be safely used for the destruction of thrips. It would pay all farmers and market gardeners to grow a patch of tobacco for use as an insecticide.

## STORING ONIONS.

In the event of a slow, over-stocked market, onions may have to be held over for a rise. The chief difficulty in this case is their liability to sprout; and it is well known that whenever onions are stored in a damp building they are almost certain to sprout, even if the temperature is

nearly down to freezing-point. This has to be avoided, because, whenever growth is set up in any bulb or seed, that bulb or seed deteriorates in proportion to the extent of growth. Onions, when pulled, should not be stored away at once, but should be left on the ground for a few hours to dry. Then they should be put away dry, in the coolest shed or barn available. They require constant looking over to sort out any bad ones, for, as in the case of fruit such as oranges, apples, pears, &c., a single rotting onion will infect all those in its immediate neighbourhood. In an article in a French journal mention is made of an experiment which deserves the attention of farmers and market gardeners. Experiments with onions were made on ten plots manured with chemical fertilisers, and the resulting crops were put away in bags and carefully numbered, with a view to planting them out in the following spring to obtain seed from them. When the time for planting had arrived it was found that, under identical conditions of temperature and light, certain lots had sprouted and were exhausted by young, premature shoots, whilst the other lots still remained hard and solid without a trace of a shoot. The collection having been carefully ticketed, it was easy to prove that the produce from plots deprived of sulphate of potash were exhausted by a too hurried vegetation, whilst that which had received the potash manure was perfectly preserved. One hundredweight of sulphate of potash per acre will have the effect above described. Meanwhile, until after the war, potash is unobtainable.

A good manure for onions is a light dressing of dung, supplemented by 4 to 6 cwt. of superphosphate, 1 cwt. of sulphate of potash (or 4 cwt. of kainit), and 4 cwt. of nitrate of soda. Potash is of vital importance

## GROWING FOR SEED.

Inferior seed is the source of frequent losses in onion culture, and many gardeners and onion specialists in Europe and America raise their own seed. The best bulbs are selected at harvest time. A short neck is considered an advantage. Uniformity in all the essential characteristics is exceedingly important in choosing bulbs for seed purposes. Seed bulbs should be carefully stored as above described, and should be planted in the autumn. The ground should be only moderately fertile, especially in nitrogen. Furrows are made 4 or 5 in. deep, and 14 to 30 in. apart, depending upon the method of cultivation. After placing the bulbs about 6 in. apart in the bottom of the furrow, they are covered with a hoe or small plough. The long slender seed stalks should have some support, which may be provided in two ways:—(1) By ridging with soil to the height of 7 or 8 in., which is the usual plan; and (2) by driving stakes at the end of the rows and at frequent intervals, and then stretching strong twine on either side. When mature, or ripe, the heads turn yellow. At this stage they should be removed promptly, with 6 to 8 in. of the stalk, before any seed is lost. As the tops do not ripen at the same time, it is necessary to make several cuttings to prevent loss. A basket with a cloth lining should be used in collecting the seed. The tops are spread in an airy room with a tight floor until dry enough to separate with a flail or by other means. Winnowing will remove most of

the chaff. The seeds may then be placed, a few pounds at a time, in a vessel of water. The heavy seeds which sink are saved, while the light ones and the remaining chaff are poured off. After thorough drying and curing, the seeds may be stored in any dry room.

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## THE PECULIARITIES OF COTTON VARIETIES.

By A. M. SOULE, Georgia State College of Agriculture.

The farmer who cultivates cotton is probably interested in two things—first of all, the quantity and quality of the lint he can obtain; and, second, the character and value of the seed produced. Of course, the lint brings in the larger revenue, and naturally his attention would centre in this item first of all; though, strange to say, probably nothing like as much consideration is given to this important subject as it deserves. The chances are that very few farmers have studied varieties of cotton and are acquainted in any sense with the wide variation in the essential characteristics which are shown, even where a test of these varieties be made on soil of uniform type and quality, and fertilised and cultivated in the same manner. Relatively speaking, much less attention has been given to a study of cotton seed than to lint; yet some very remarkable differences in the character and yield of seed obtained from different varieties of cotton have been recorded; and in fact they mean so much in a financial way to the farmer that some suggestions along this line may not be out of place.

In a variety test made on the College Farm in Athens, Georgia, in 1912, the following data were secured:—One variety from the first picking yielded 1,445 lb. of seed cotton; from the second picking, 680 lb., and from the third picking, 21 lb. This was a total yield of 2,146 lb. of seed cotton per acre, or 901 lb. of lint per acre. It took 4,000 seeds to make 1 lb. The length of the staple was 15/16 of an inch; the per cent. of lint, 40; and the per cent. of disease, 2. Growing alongside this cotton was another strain, which yielded 701 lb. of seed cotton from the first picking, 212 lb. from the second picking, and 21 lb. from the third picking. The total yield of seed cotton per acre was 934 lb. The yield of lint was 280 lb. The lint, however, was 17/16 in. in length. The per cent. of lint fell to 36, and the per cent. of diseases ran up to 20. Notice the astonishing contrast between these two varieties of cotton, and if you are farming go out into the field and make a few observations for yourself, and see which one of these strains the variety you are growing most nearly corresponds with.

In this instance observe that there was more than three times as much lint produced by the first variety as by the second. A part of the difference between these strains was no doubt due to the high per cent. of disease. The yield of seed from the two strains also showed a marked difference. Undoubtedly the seed from the first variety was more desirable for planting and for milling than from the second variety. The reason is obvious: there was a smaller percentage of disease. In the case of the first strain, practically all of the cotton was got out with the second picking, thus insuring its perfect maturity before frost. These are advantages of great concern to the farmer, for his

seed are worth more for manufacturing purposes than that derived from an inferior strain of cotton, and they will also germinate better; and his chances of securing a stand the next year are greatly enhanced thereby.

Observations made on the college farm show that the number of bolls required to make 1 lb. of seed cotton varied from 54 up to 105; that the number of seeds to the lb. varied from 2,688 to 6,100. There was also a marked variation in the length of the lint and in the per cent. of disease. The seed must be in perfect condition in order to produce a fine quality and quantity of lint. Therefore, their study and consideration become matters of the utmost importance. Those strains which will enable the farmer to produce the largest quantity of medium to large-sized, sound, wholesome seed, high in oil and protein, should be selected for planting. Study along this line will enable much information to be gained and much progress to be made. In view of the large interests involved, it is time that attention was directed to this matter. Every farmer should go into his field and study his crop carefully and compare it with his friends' and neighbours', and so be in position to select seed from the most vigorous and productive types and which produce seed and lint of a desirable quality. As he selects and improves his strain of seed, they will command a higher and higher price for manufacturing purposes, and he will gain the monetary advantage which is certain to accrue to him from producing a better quality of lint and seed.

The farmer should also select his seed with the idea of early maturity —that is, getting the largest amount of lint and seed from the first picking. In this respect a wonderful variation is shown in varieties. As already noted, only 21 lb. of seed cotton was obtained from the third picking of the two strains mentioned above. On the other hand, varieties grown alongside these strains yielded from 170 to 382 lb. from the third picking. Naturally, there was a corresponding low yield from the first picking. In fact, several of the varieties produced from the first picking from 1,020 to 1,445 lb. A failure to emphasise earliness results in the production of a large quantity of undesirable lint and imperfect seed. Both of them are of much less value than they would be in varieties where early maturity has been emphasised.

These facts would indicate that a number of the most desirable qualities in the production of seed of a superior value for milling purposes, and of a lint which will command a premium on the market, can be successfully correlated in varieties of cotton through the exercise of patience and skill in seed selection. This work is entirely practicable for the average farmer, and will result in a variety of benefits. The issues involved are of very great importance and cannot be over-emphasised in view of the approach of the boll weevil* and the relatively high cost of labour and fertilisers now entailed in the production of cotton. To meet the new conditions of production which circumstances have placed upon the farmer, he must increase his yield of lint and improve the quality of his seed. The suggestions made will be helpful in this direction.—"Press Bulletin."

* This refers to the American boll weevil. Fortunately this pest has never appeared in Queensland —[ED. " Q.A.J."]

# The Orchard.

## A WINTER MELON.

### THE CASSABA.

There is a class of musk melons grown in the United States of America known as Winter Musk Melons (*Cucumis melo*, var. *inodorous*), which, if picked before frost and stored in a cool place, ripen up very slowly, often keeping until after Christmas time. These melons are of a sweet melon flavour, and are valuable for their long-keeping qualities. Amongst the best are: Winter Climbing, Nutmeg, White Antibes, Pine-apple, and Golden Beauty, of which latter we give two illustrations.

When Mr. W. H. Mobsby was at the Panama Exposition in San Francisco, he obtained some seeds of the winter melon known locally as "Cassaba," and since his return he has succeeded in raising some plants which have lately fruited. From his description of the Cassaba it appears that in the United States the fruit ripens in July, and continues bearing and ripening all the summer and autumn until the frosts come. The fruit can be stored in a cool place, and it will ripen slowly, so that they can be marketed from time to time until late in January (in the U.S.A.). The fruit is of a bright yellow colour, nearly globular in shape, with a wrinkled skin, and is slightly pointed at the stem end. In size the fruits vary from 6 to 8 in. in diameter. The flesh is pure white and very thick, as shown in the illustration. Such a class of fruit would travel well, and could be placed in a perfectly sound condition in the markets of the Southern and Western States of the Commonwealth. The seed should be sown in Queensland after all danger to the young plants from late frosts is past—say, at the end of August or in September.

Whilst in San Francisco, Mr. Mobsby had a full opportunity of observing the many fruits grown in California, and how the American "boost" their vine production. Each of the principal fruits has a special day when in season, such as Orange Day, Prune Day, Melon Day, &c., and to such an extent do they patronise such productions that instructions are given as to how to place the fruits on the show tables, and such fruits are well advertised by the Californian Fruit Growers' Exchange, who act as the medium between the growers and the buyers. No other middleman is allowed in this important work; consequently the grower gets a fair price for his fruit, which is graded and distributed in the market, so that the consumer in turn gets full value for his money. Amongst other fruits the cassaba is a great favourite, and Mr. Mobsby considered it would be an ideal fruit for Queensland owing to its type and keeping qualities.

Plate A shows the fruit cut, and B a fruit raised at Indooroopilly by its introducer.

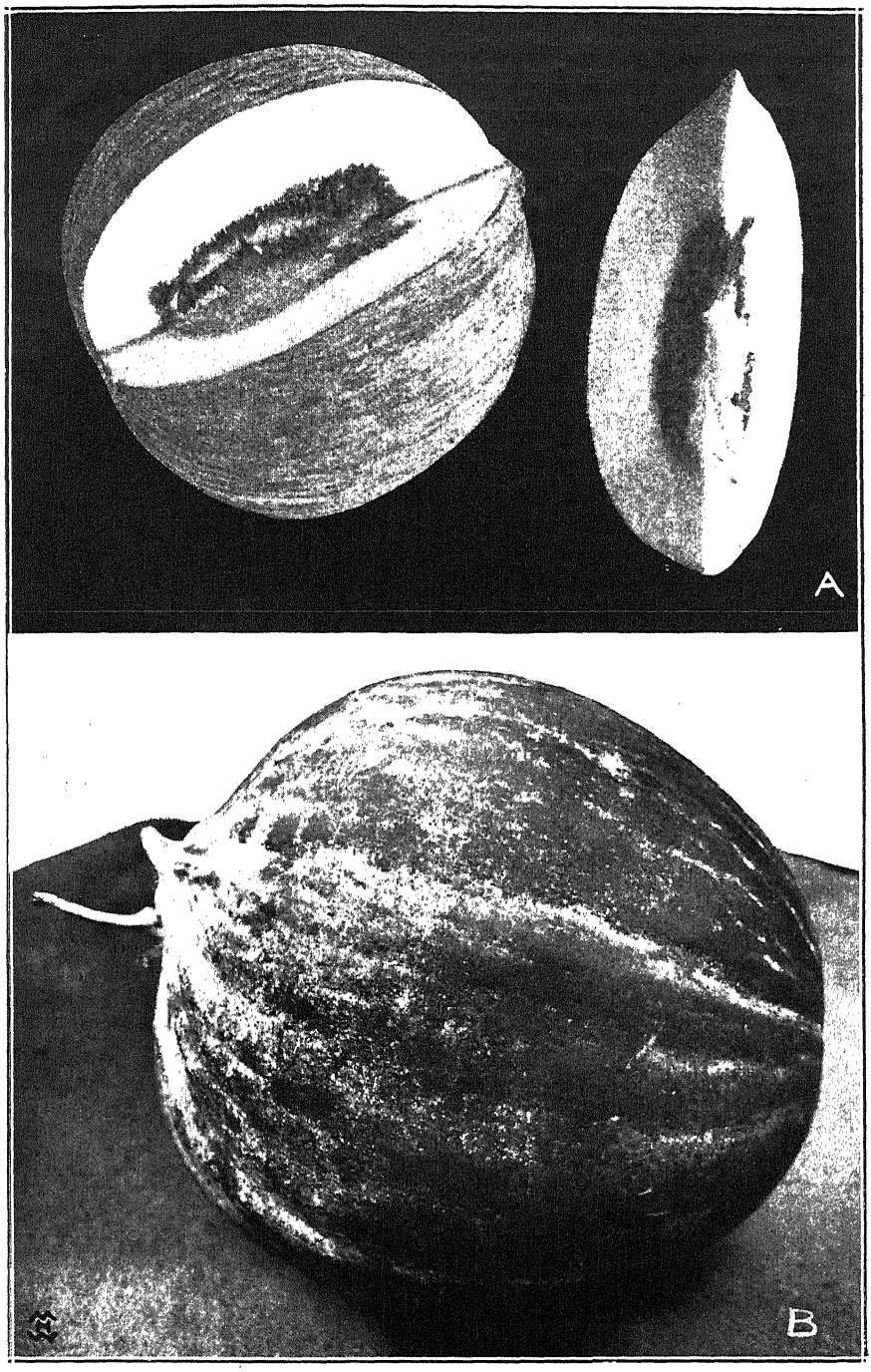



PLATE 10.—THE CASSABA : A WINTER MELON.

## TO TRAP ORANGE MOTHS AND FRUIT FLIES.

"Fruit World's" Queensland correspondent gives the following advice to citrus-growers, who will doubtless have trouble with these pests during the coming few months:—

"The fruit of the new crop of citrus trees will be showing signs of ripening towards the end of the month. As the fruit during this period of its growth is very liable to the attack of insect pests of various kinds, it is important that steps should be taken to prevent loss arising from this cause as far as possible.

"Large sucking moths of several kinds attack the fruit as soon as it shows signs of ripening; and, as they always select the first fruit that shows signs of colouring, it is a good plan to gather a few forward fruit and to ripen them up quickly by placing them on the barn floor and covering them up with bags or straw. They will turn colour in a few days, and develop the characteristic scent of the ripening fruit. The fruit so treated should be hung up in conspicuous places in the orchard as trap-fruit, as not only will it attract the moths but also the fruit flies. The moths will be found clustered round the trap-fruits in large numbers, and can then be easily caught and destroyed. Fruit fly will also puncture such fruit; and if the fruit is destroyed before the larvæ reach maturity, a later crop of these insects is prevented from hatching out. Fruit flies may also be caught in large numbers by means of such artificially ripening fruits. The fruits are smeared with tanglefoot and hung about the orchard. The fly, attracted by the colour, settles on the fruit, and is caught in a similar manner to house flies on specially prepared sticky paper. These simple remedies, if carefully carried out, will result in the destruction of large numbers of sucking moths and fruit flies."

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## DEPUCKERISING THE PERSIMMON.

The "Monthly Bulletin" of the California State Commission of Horticulture for January, 1917, describes a method of removing the astringent properties of the persimmon as practised in Japan, and mentioned in an article in the Bulletin on ripening the persimmon by Mr. Sumito Fujii. Mr. O. E. Bremner, Horticultural Commissioner, Sonoma County, says:—

"The Japanese have a method, the origin of which, as with all other such processes that have been handed down from generation to generation, is probably unknown. They take a soy tub which has just been emptied of the soy and fill it with persimmons, covering the top tightly. After a few weeks the persimmons are removed perfectly ripe and without the astringent property. Mr. Roeding tried this process, but says it is not practical on account of the difficulty in securing fresh soy tubs.

"The soy tub and the soy are not essentials to the process, although the Japanese believe they are. A simple manner and one perfectly effective is to place the persimmons in layers of chaff or fine straw or

hay in the boxes so as to exclude the light. The fruit will ripen in from two to six weeks, depending on its condition when picked. They may be gathered even before they have begun to take on the yellow colour and yet ripen so perfectly that they may be eaten like apples without even removing the skin. This is not strictly true of some of the seedlings, but does refer to the varieties mentioned in Mr. Fujii's article.

"It is not essential to the ripening of persimmons that they remain on the tree until slightly frosted. The longer they remain on the tree the higher the colour and the quicker they ripen. We usually put away about five lug boxes, each containing two or three layers of persimmons, according to the size of the fruit. When cured this way, persimmons make an elegant appetizer served either with cream or without."

## GIRDLING OR CINCTURING FRUIT TREES.

There would appear to be some doubt in the minds of our fruit-growers as to the efficacy of girdling citrus and other fruit trees, as described in occasional articles which have appeared in this Journal, for the purpose of inducing the setting of the fruit. Some growers have reported that the method proved successful; others that no appreciable difference was observable in the crops produced by girdled and ungirdled trees in the same orchard. It would be very instructive if growers who have tried the system would give us their opinion on the subject for the benefit of other orchardists. In this way very valuable testimony *pro* and *con* could be placed before our readers.

## REGISTRATION OF ORCHARDS.

Under the "Diseases in Plants Act," every orchard must be registered by the owners or occupiers thereof on or before the 31st day of March in every year. The form of application is to be filled in and forwarded to the Under Secretary, Department of Agriculture and Stock, Brisbane, on or before the date mentioned in each year.

An orchard is defined as "Any place within a fruit district where one or more fruit-producing plants are grown."

Forms of Registration of Orchards may be obtained from Clerks of Petty Sessions, or at the Head Office, Department of Agriculture and Stock, Brisbane.

Under "The Diseases in Plants Act of 1916" it is notified that "failure to comply with this section of the Act renders the occupier or owner liable to a penalty of not less than one pound nor more than five pounds for a first offence, and not less than two pounds nor more than ten pounds for any subsequent offence."

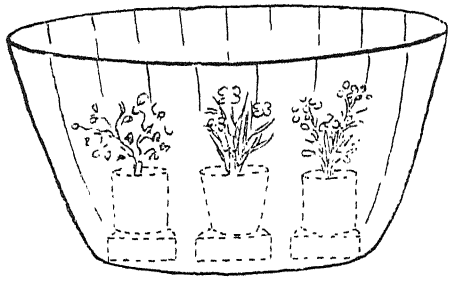
No fee is charged for registration.

# Horticulture.

## HOW TO KEEP POT PLANTS ALIVE WHEN ABSENT FROM HOME.

"South African Gardening and Home Life" is a very interesting and useful paper devoted to the interests of gardeners, amateur and professional. It is published monthly at Johannesburg, Transvaal; and each month three prizes (seeds or garden sundries to the value of £1 1s., 10s., and 5s.) are awarded to the reader who sends in the best dodge to save time and labour in any gardening operation. The following "dodge" was published in the February issue of the above journal, and deservedly obtained first prize. Many people in this State leave their homes for a week or two at holiday time, and there being no one to look after the garden or pot plants, the latter are liable to succumb to the want of water. The remedy is simple; but how many have discovered it?

"Take a large tub or pan and as many common bricks as there are plants. Place the bricks in the tub and just cover them with water; then





stand the plants on them. Being porous, the bricks will absorb the water, and the plants will draw up all the moisture they require and keep in good condition for some time.

"Trusting this hint will be of use to those of our readers who will be holiday-making this summer-time."

# Viticulture.

## RAISIN DRYING AND CURING—No. 2.

*Taking Up.*—When the raisins are sufficiently dried, they must be taken up as quickly as possible. This process, again, consists of three different labours—the stacking, assorting, and boxing. It is of great importance to know exactly when the raisins have sufficiently dried to be ready for the sweatboxes. This can properly be ascertained only by experience; still, a few directions will materially help. A perfect raisin should be neither too hard nor too soft. The raisin is too soft when, after rolling it between the fingers, the least particle of juice exudes through the cracked skin or meat. Such raisins will "sugar" in course of time, and will not keep a year. If the raisins or the majority of them on a bunch are too wet, they should be spread to the sun for some time longer. If, however, there are only a few underdried raisins in a bunch, the bunch may be taken in, and the soft raisins clipped off afterwards. A raisin is too dry when, in pressing and rolling it between two fingers, the pulp does not move readily inside the skin. Such overdried raisins will not again become first-class raisins; their skin will always be tough, and their colour will be somewhat inferior. If but slightly overdried they may be brought out by equalising. To know when the raisins are in a proper condition to take up is most important to every raisin man, and he should never neglect to watch his trays early and late. Upon his good judgment and watchfulness depends the quality of his crop.

To prevent too rapid drying out after the raisins are nearly ready, the practice now is to stack the trays in the field. This stacking simply consists in placing the trays which contain the ready raisins on top of each other in piles 5 ft. high. On the top of each pile are placed several loose trays crosswise, so as to shelter the pile from the sun, and possibly even from rain, and other trays are raised up against the sides of the pile in order to exclude as much air as possible. If, however, the raisins are rather underdried, the side trays may be left out so as to allow the raisins to dry more. It is always best to stack the trays before the raisins are fully dried, as they will finish drying and curing in the stack much better than in the sun. After the stacking is done, the assorting is in order. This consists in taking out every bunch that is not sufficiently dried to go into the sweatbox, and placing them on new trays to dry more. At this time also the bad or inferior and red berries may be taken out if present in a large quantity on good bunches; but when there are only a few on it is better not to touch the bunch, as, in handling, it is apt to break. The boxing and assorting, which may be considered together, consist in transferring the different grades of the now dried raisins to separate sweatboxes. This is done in two ways. The No. 1 bunches, which have been placed on separate

trays, may now be slid into the sweatbox. Between every two layers of these first-class bunches should be placed a clean paper, cut so as to exactly fit the box. It is of importance to have the paper to fit the box, and not to be too large or too small, as in either case the raisins may become mixed and the bunches broken. It must be remembered that the more paper is used the less apt are the bunches to be injured. On the top and in the bottom of every box must be one paper to keep out dust.

*Covering.*—If the weather has been favourable, the raisins may have been cured in twelve days. Of these twelve days the first seven or eight were used for drying the upper side of the raisins. On the seventh or eighth they were turned; and on the twelfth they were ready to put in the sweatboxes. But this is fast drying, and under favourable circumstances. It generally takes a longer time—from fourteen to twenty-one days. In Malaga they cover the raisin floors every night with canvas; and in the morning, when the canvas is unrolled, the raisins are yet warm. This method is to be recommended wherever there is any difficulty in curing the first or second crop. The method to be followed is to place the trays in rows; along and around the rows posts are driven, leaving 2 ft. clear of the ground. On one side (the south) the posts are not to project so high above the ground, so that the covering may be slanting; then by means of wires, rings, and canvas, a covering can be made which will protect the raisins from the dews of night and secure a uniform temperature for curing.

*Dryers.*—Dryers of different descriptions have from time to time been patented, and are for sale by various firms, as, for instance, Messrs. Ellwood, Cooper, and Co., of Santa Barbara, California, U.S.A., sell a dryer large enough to hold 1 ton of fruit for about £42.

The dryer is simply a wooden box with heating apparatus attached, about 17 ft. square and 6 ft. high, and looks from the outside like a chest full of drawers. These slide on frames, are deeper than they are broad, and contain movable bottoms or trays. The ventilation is had by small sliding doors at the bottom of the chest, through which the air rushes in, while it goes out through the drawers, which are open an inch or two for that purpose. Dryers are not for the purpose of entirely drying the raisins in them, but only to finish up the raisins when, on account of unfavourable climatic conditions, they do not dry any more out of doors. No one would think of drying raisins in the dryer altogether, as it would not pay. Raisins properly finished in the dryer are not inferior to those entirely sun-dried.

*Sweatboxes.*—These should be of 1-in. timber. The length and width should be according to the size of the tray, and always 1 in. larger every way than the tray, so that the raisins may be let down easily or that they may receive a tray. The height of a sweatbox should be from 6 to 8 in., no more. In order to secure the box and prevent it from splitting, the sides should be bound with iron or wire.

*Trays for Drying.*—The tray consists of a wooden frame made of well-seasoned ½-in. timber nailed to cleats 1 in. by 1 in. by ½ in., and of

the desired length. The size of the tray varies according to the idea of the raisin-grower; but the size generally adopted is 2 ft. by 3 ft. When the season is over, every tray should be nailed up and washed, or at least swept clean, and stored dry. The age of a tray, if cared for, is about ten years.

*Boxes and Cartons.*—There are three kinds of packages in use in the raisin market—whole boxes of 20 lb., halves of 10 lb., and quarters of 5 lb. The wholes and quarters are those most used; while the halves are seldom used or required. The cartons are made of paper, and contain 2½ lb. of raisins each.

The following are the measurements of raisin boxes and cartons, and of the timber required for making them:—

| | |
|---|---|
| 20-lb. box .. .. .. | 9 × 18 × 4¾ in. |
| 10-lb. box .. .. .. | 9 × 18 × 2⅜ in. |
| 5-lb. box .. .. .. | 9 × 18 × 1³/₁₆ in. |

The foregoing are inside measurements.

The tops and bottoms are ¼ in. thick, 19½ in. long, and 9¾ in. wide.

The sides of the 20-lb. box are 19½ in. long, 4¾ in. wide, and ⅜ in. thick. The ends of a 20-lb. box are 9 in. long, 4¾ in. wide, and ¾ in. thick.

The sides of the 10-lb. box are 19½ in. long, ⅜ in. thick, and 2⅜ in. wide. The ends of a 10-lb. box are 9 in. long, ¾ in. thick, and 2⅜ in. wide

The sides of a 5-lb. box are 19½ in. long, ⅜ in. thick, and 1³/₁₆ in. wide.

CARTONS.

The 2½-lb. carton is 5 in. wide, 10 in. long, and 1½ in. deep.

| | Sides. | Ends. |
|---|---|---|
| 20-lb. box .. | 19½ × 4¾ × ⅜ .. | 9 × 4¾ × ¾. |
| 10 lb. box .. | 19½ × 2⅜ × ⅜ .. | 9 × 2⅜ × ¾. |
| 5-lb. box. .. | 19½ × 1³/₁₆ × ⅜. | |

*Lye-dipped Raisins.*—This process is of considerable importance, especially in localities where the drying of the first crop is accomplished with difficulty in the open air. The first and also most important condition in producing superior dipped raisins is that the grapes should be absolutely ripe. Unripe grapes will not produce any good raisins when dipped, but will turn reddish and otherwise become inferior.

*Dipping Process.*—Water must be continually flowing while the operation of dipping lasts, and if it be not available in a natural state, it must be produced by artificial means. Flowing water is of great importance in producing good dipped raisins, and is required for the perfect washing of the grapes. The following is a cheap and efficient arrangement for dipping in actual use in one of the largest vineyards where running water is not available, and the system can be recommended on account of its cheapness and easy working:—On one side of the trough in which the grapes are dipped is a stationary iron kettle with a fireplace underneath. By the trough is also placed an upright post about 5 ft. high, and on this is balanced a horizontal beam with a double

motion. It can be raised and lowered at either end, or swung to the left or right with ease. On one end of the beam is a hook on which to hang the grape bucket. On the other side of the trough is a rough assorting table. Two or more buckets are needed. The buckets are common galvanised-iron buckets, perforated thickly with holes, the latter not large enough to let any loose grapes through. In the kettle, which is kept constantly boiling, is a solution of water and potash; soda is not suitable. The very best potash should be used, in the proportion of about 1 lb. to 12 gallons of water. The ripe grapes are now brought to the table and emptied into the buckets. A bucket is then hung on the beam, the latter swung round, and the bucket for a second lowered first into the pure water and then into the boiling potash; but it is immediately withdrawn and immersed in the water trough. When rinsed for a few seconds, the grapes are taken out and spread on common raisin trays. If the weather is warm, the trays are stacked one on top of the other, and the grapes thus prepared are dried in the shade. The rinsing of the fruit before drying is of great importance. In Valencia the finest raisins are treated in that way and thoroughly rinsed before being dipped in the lye. But nowhere in Spain are the grapes rinsed in water afterwards, and it is yet an undecided question whether the rinsing improves or injures the raisins. It is certain that the washing cleanses the berries, but whether it is an advantage to deprive the berries of the lye which more or less sticks to them is very doubtful. The arrangement of dipping kettles, &c., may, of course, be greatly varied. Steam may be used for heating the lye and the rinsing water, if it be desired to keep the latter hot; and regular trays might be used to hold the grapes instead of the buckets before mentioned. Every grower will, no doubt, vary these appliances to suit his own fancy and improve upon the method of others.

The length of time required for dipping can only be ascertained by experience, and must differ with the strength of the lye, with the heat of the solution, and with the thickness of the skin of the grapes. Thus, in different localities, the strength of the lye and the length of the immersion must always be different, and may even differ from year to year. When properly dipped, the skin of the grape must show some very minute cracks, similar to the cracks in glass which has been heated and suddenly immersed in or sprinkled with ice-cold water. Deep cracks are not desirable, as they will cause the juice of the pulp to leak out, after which the raisins will sugar. In Valencia the grapes used for dipping are the various varieties of Muscats; while in Smyrna both Muscats and Sultanas are used. Corinths are never dipped, as they dry readily and make superior raisins without this process.

*Drying and Curing.*—After the grapes are dipped, they must be immediately dried, either in the sun, or in the sun and shade alternately, or entirely in the shade. According to the circumstances attending the drying of the grapes the colour of the raisins becomes more or less red or yellow, transparent or opaque. The most perfect amber colour is attained in the shade; while in the sun the colour rapidly changes to reddish or to a less desirable colour in dipped raisins. The more

favourable the weather for drying the choicer will be the raisins and the better their colour. If the sun is very warm and the chances are otherwise favourable for drying, the trays should be exposed to the sun only long enough to have their dip thoroughly evaporated, and for this purpose one day may suffice.

After this, the stacking of the trays is advisable, and only occasionally may the trays be spread if the drying does not proceed rapidly enough. Such shade-dried dipped raisins will assume a beautiful amber-yellow colour, and will bring more per pound than those exposed to a very warm sun. If, however, the weather is not very warm, the grapes must be dried in the sun, and the grower has then to be satisfied with the colour that Nature will give to his raisins. Dipped raisins do not necessarily require turning, as they generally dry well in from four to six days in fair weather. For this class of raisins dryers are very useful to help finish the drying. Such dryers must be almost airtight, as storms would invariably spoil the raisins, which, on account of their stickiness, are almost impossible to afterwards cleanse. Dipped raisins should always be dried on their trays.

*Stemming, Grading, and Packing.*—Dipped raisins should be stemmed when well dried, and then graded in two grades. The proper receptacles for them are either sacks lined with paper or 20-lb. boxes, in which they may be packed without fancy paper or in the same way as prunes or other dried fruit.

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## CONSERVATION OF THE WINE DURING THE FIRST YEAR.

By G. A. GATTINO.

In my previous notes referring to the above subject, I mentioned that the substances contained in the air, excepting the oxygen, are dangerous to the wine, and therefore the wine to be transferrd should avoid contact with the air as much as possible.

For this purpose (and without submitting the wine to agitations) force or suction pumps are used with great advantage.

Recently, on the market, there are several kinds of well-improved pumps; but I do not want to describe them here or to recommend any of them. It remains for you to choose the one which can combine the efficacy of the work with the economy of the cost.

The casks into which the wine will have to be transferred must be completely full and hermetically closed, to prevent any air getting in contact with the liquid.

The wine in the casks, however, gradually decreases in quantity, either by absorption of the wood or by evaporation effected through the pores of the latter, or also by the escape of the carbonic acid from the liquid.

It is, therefore, necessary to remedy this loss of quantity by keeping the casks always filled; otherwise an empty space would be formed on

froth. Then pour into the cask; and after stirring for about a quarter of an hour let the liquid stand. For facilitating the solubility of the albumen, add to the white of the eggs a pinch of salt.

In using the blood, practise the same method as for the albumen of eggs. Only very fresh blood has to be used, and about 2 drams Av. per gallon of wine. Do not use the blood as a clarifier for light wines, as it would weaken the latter too much.

Besides the clarifiers derived from animal solids and fluids, there are also others drawn from mineral substances, such as the allumine argil, special earth, &c. These clarifiers are cheap, but they must be first purified of all strange and impure substances, especially organic matter.

After applying any clarifier, the wine will have to be kept quiet for a certain time, so that the clarifying substances may produce the proper effect. When the wine is perfectly bright it must be racked off; otherwise the sedimentations would re-awake, rendering the clear wine again turbid. As a general rule, the "finings" will be effective only when the wine is complete, and all slow and sensible fermentations are finished. If, however, for trade purposes you have to make brilliant a wine not yet completely finished, then you will first have to stop the slow fermentation. This can be obtained by adding 3 drams Av. per gallon of metasulphite of potash. When all trace of fermentation is arrested, add the required clarifier to the turbid wine you have to finish off.

[TO BE CONTINUED.]

## COTTON AND KAPOK FOR UPHOLSTERY.

An impression having gone abroad that kapok should be used for upholstery purposes, such as stuffing sofas, chairs, pillows, &c., instead of cotton, on the extraordinary ground that cotton is affected by disease germs, we would point out that cotton has been used in Queensland and in other parts of the world for these purposes for a long series of years, and no ill effects have ever attended its use. It is far more likely that kapok might carry disease germs, owing to the insanitary conditions under which it is grown, prepared, and baled for export in some tropical countries, where coloured labour is employed, and where such diseases as cholera, malarial fevers, skin diseases, smallpox, &c., are frequent amongst native labourers. Cotton in Queensland is grown and prepared under the best hygienic conditions, under the supervision of the Department of Public Health, so that it is practically impossible for Queensland-grown cotton or cotton-seed to be prejudicial to health. Kapok, on the other hand, may easily convey disease germs, since there is no supervision exercised over the gathering and treatment of the crop. Our cotton-growers, ever since cotton was largely grown in the State, have used cotton for stuffing mattresses, pillows, chairs, &c., and nothing was ever heard of the article spreading diseases. It seems to us that the impression has arisen owing to some trade rivalry, of which we know nothing, but users of cotton in any shape may rest assured that our cotton has never carried any disease germs.

# Entomology.

## THE LANTANA PEST.

### A NEW FLY IMPORTED FROM HAWAII.

Many persons favour the lantana plant for its soil-fertilising properties, but in some districts in Queensland it has smothered extensive areas and constitutes a veritable pest. This fact recently led the Department of Agriculture, through its entomological scientists, to make investigations as to the means whereby it might be combated, and following on representations made by the Government Entomologist (Mr. H. Tryon), the assistant (Mr. H. Jarvis) visited Honolulu and Fiji to make further inquiry with respect to the lantana combating insect employed there, and to secure a number of the insects. Mr. Jarvis has now returned to Queensland, and Mr. Tryon stated that he had succeeded in safely transferring overseas a large number of lantana seed destroying flies. Some of them were secured in Honolulu and some in Fiji.

It was explained by Mr. Tryon that steps were being taken to establish the flies in three distinct localities where the conditions under which the host plant is growing differ notably in respect to climate and other conditions. The first district is that of Brisbane, the second the North Coast, while the remaining district will be the Mackay or Townsville areas. Insects were liberated in the Brisbane district on Monday and Tuesday, and on Wednesday the flies were being freed in the North Coast district. With regard to the experiment in the Northern area, Mr. Jarvis left Brisbane on Friday, 16th March, and the flies he would liberate would be those secured in Fiji. The Government Entomologist emphasised the fact that the outcome of these operations scarcely could be fully ascertained for a considerable time. Although the fly multiplied rapidly, the task before them is so enormous, and the area over which the lantana extends is so vast, that results could not be expected until a long period elapsed, provided that the flies subsisted under our climatic and other conditions. He felt, however, that there was every prospect of the project proving successful. He also pointed out that the introduction of the insect would present no interference with the use of lantana by those who desired to do so as a cover crop or as a means of honey production, and added that the habits of the fly so far as they relate to forms of vegetation other than lantana had also been under close observation for years. It was, therefore, possible to affirm that neither in its native home—Mexico—nor in any of the countries to which it has been introduced, has it ever associated itself injuriously with any plant other than lantana. There was no ground for any sugges-

tion that the insect was likely to change its habits, the experience being that in the absence of lantana no propagation took place, and that eventually it died. The fly laid numerous eggs, depositing a single one in the lantana berry while it was still green, and therefore it did not ripen properly, but dried up. The plant was not destroyed, but the seed, not coming to maturity, would no longer be available for the propagation of the plant and the extension of the infested area.

Mr. Tryon has assumed that the fly will be able to live under the climatic conditions of Queensland, but he is by no means confident that this will be the case so far as the southern localities are concerned. That was a matter to be determined by the experiments. The number of flies at present available is not sufficient to permit of immediate distribution to those who desire to use them for lantana repression. The Government Entomologist's first business is to establish them locally by colonising and breeding them. He stated that the fly was first procured by Mr. Albert Koebele, the well-known entomologist employed by the Hawaiian authorities to discover insects injuriously affecting the lantana plant and to introduce them into the Sandwich Islands. In the course of this undertaking he discovered the fly in Mexico, to which country lantana is indigenous. The insects were transferred to Honolulu, where they and other lantana-injuring insects were established. Eventually the fly was also established at New Caledonia and Fiji.

Mr. Tryon said that Mr. Jarvis's mission was most successful, and he had accomplished all that was expected of him. Thanks were also due to the official entomologists at Hawaii, who had done all they could to assist the undertaking.

## DESTROYING NUT GRASS IN GARDENS.

The presence of this pernicious weed in small gardens disheartens many small householders to the extent of causing them to give up all hope of successfully raising either vegetables or flowers. Many requests reach us for information as to how the pest may be destroyed. It was pointed out at an agricultural conference held at Mackay in June, 1899, by Mr. W. Gibson, Bingera, that a patch of nut grass on rich soil was successfully destroyed by the use of molasses. A few casks of molasses were poured over it, and water on the molasses. It all fermented, and by keeping this going for a week the whole of the nut grass was destroyed, since which the land had been wholly free from it.

Mr. P. McLean said that a small area of nut grass may be completely eradicated by laying sheets of iron over it, so as to exclude it from light and air. This, he said, was on the same principle as Mr. Gibson's molasses. Both were effectual remedies, but, of course, it could only be done on small areas. We advise anyone having nut grass in a small garden to give these simple remedies a trial.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH FEBRUARY TO 26TH MARCH, 1917.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Sylvia II. ... | Shorthorn... ... | 16 Jan., 1917 | 802 | 4·8 | 45 40 | |
| Lady Margaret | Ayrshire ... ... | 6 Jan. ,, | 830 | 4·4 | 42·99 | |
| Lady Melba | Holstein ... ... | 14 Feb. ,, | 1,035 | 3·4 | 41·13 | |
| Miss Edition | Jersey ... ... | 25 Dec., 1916 | 756 | 4·6 | 40·96 | |
| Iron Plate ... | ,, ... .. | 9 Dec. ,, | 615 | 5·1 | 37·04 | |
| Twylish's Maid | ,, ... ... | 2 Nov. ,, | 493 | 6·2 | 36·22 | |
| Miss Bell ... | ,, ... ... | 1 Aug. ,, | 475 | 6·4 | 36·04 | |
| Comedienne | ,, ... ... | 24 Nov. ,, | 466 | 6·2 | 34·23 | |
| Violet's Peer's Girl | ,, ... ... | 13 Dec. ,, | 507 | 5·7 | 34·20 | |
| Lady Spec... | Ayrshire ... ... | 17 Jan., 1917 | 710 | 4·0 | 33·34 | |
| Constancy ... | ,, ... ... | 27 Dec., 1916 | 513 | 4·6 | 33·22 | |
| Sweet Meadows | Jersey ... ... | 18 Aug. ,, | 404 | 6·5 | 31·14 | |
| Lady Annette | Ayrshire ... ... | 11 Nov. ,, | 577 | 4·2 | 28·48 | |
| Thornton's Fairetta | Jersey ... ... | 26 May ,, | 379 | 6·3 | 28·29 | |
| Nina ... | Shorthorn... ... | 23 June ,, | 595 | 4·0 | 27·94 | |
| Lady Dorset | Ayrshire ... ... | 14 Sept. ,, | 462 | 4·7 | 25·59 | |
| Jeannie ... | ,, ... ... | 27 Oct. ,, | 494 | 4·4 | 25·58 | |
| Queen Kate | ,, ... ... | 15 June ,, | 492 | 4·4 | 25·48 | |
| Hedges Dutchmaid | Holstein ... ... | 22 Aug. ,, | 469 | 4·6 | 25·41 | |
| Bluebelle ... | Jersey ... ... | 22 June ,, | 430 | 4·8 | 24·33 | |
| Glen ... | Shorthorn... ... | 18 Jan., 1917 | 505 | 4·2 | 24·93 | |
| Lilia ... | Ayrshire ... ... | 4 Sept., 1916 | 412 | 5·0 | 24·30 | |
| Belonda ... | ,, ... ... | 23 Feb., 1917 | 519 | 3·8 | 23·13 | |
| Rosine ... | ,, ... ... | 16 July, 1916 | 397 | 4·9 | 22·94 | |
| Netherton Belle | ,, ... ... | 11 Mar. ,, | 294 | 6·5 | 22·65 | |
| Cocoatina ... | Jersey ... ... | 6 Mar., 1917 | 407 | 4·3 | 20·59 | |
| Skylark ... | Ayrshire ... ... | 21 Mar., 1916 | 314 | 5·4 | 20·04 | |

The above cows were grazed on natural pasture only.

## BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following list of breeders in Queensland of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in this State. The Department of Agriculture and Stock undertakes no responsibility in relation to the entries in the list; but, when making inquiries, the condition was imposed that the entries were to be comprised only of the stock that had been entered in a herd book or are eligible for entry.

The list as now published is incomplete; it includes the information received to date, and will be added to from time to time. Any owner desiring to have his stock included, should notify the Under Secretary of the breed of purebred stock he owns, the number of males and females entered or eligible for entry in a herd book, and the herd book in which they are entered:—

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| **AYRSHIRES.** | | | | |
| Queensland Agricultural College | Gatton .. .. | 14 | 45 | Ayrshire Herd Book of Queensland |
| State Farm .. .. | Warren, Rockhampton | 9 | 88 | ditto |
| H. M. Hart .. .. | Glen Heath, Yalangur | 6 | 15 | ditto |
| L. H. Paten .. .. | Jeyandel, Calvert .. | 8 | 20 | ditto |
| J. H. Paten .. .. | Yandina .. .. | 8 | 23 | ditto |
| J. H. Fairfax .. .. | Marinya, Cambooya | 9 | 55 | ditto |
| State Farm .. .. | Kairi .. .. .. | 4 | 8 | ditto |
| F. A. Simpson .. | Ayrshire Stud Farm, Fairfield, South Brisbane | 17 | 68 | ditto |
| J W. Paten .. .. | Wanora, Ipswich .. | 10 | 42 | ditto (Includes 29 cows in advanced register.) |
| J. Holmes .. .. | "Longlands," Pittsworth | 6 | 20 | Ayrshire Herd Book of Queensland |
| **JERSEYS.** | | | | |
| W. Siemon & Sons Ld. | Roma st., Brisbane .. | 6 | 60 | Queensland Jersey Herd Book |
| Queensland Agricultural College | Gatton .. .. | 13 | 30 | ditto |
| W. J. Barnes .. .. | Cedar Grove .. | 10 | 27 | ditto |
| W. J. Affleck .. .. | Grasmere, N. Pine .. | 6 | 31 | ditto |
| M. W. Doyle .. .. | Moggill .. .. | 4 | 12 | ditto |
| State Farm .. .. | Kairi .. .. .. | 6 | 40 | ditto |
| James T. Turner .. | The Holmwood, Neurum | 1 | 5 | ditto |
| Robert Conochie .. | Brookland Jersey Stud Farm, Brooklands, Tingoora | 9 | 21 | ditto |
| G. A. Buss .. .. | Bundaberg .. .. | 5 | 14 | ditto |
| T. V. Nicholson .. | Windsor .. .. | 2 | 8 | ditto |
| Geo. H. Crowther .. | Montrose, Oakey .. | 7 | 43 | ditto |
| E. F. Fitzgibbon .. | Listowel, Oakey .. | 7 | 30 | ditto |
| M. F. and R. C. Ramsay | Talgai, Clifton .. | 5 | 37 | Jersey Cattle Society, Queensland |
| J. N. Waugh & Sons .. | "Prairie Lawn," Nobby | 2 | 44 | Queensland Jersey Herd Book |
| T. Mullen .. .. | Chelmer .. .. | 3 | 20 | ditto |
| J. C. Brimblecombe .. | "Lolworth," Kingsthorpe | 1 | 13 | ditto |
| James Strong .. | Woodlands .. .. | 5 | 18 | ditto |
| **GUERNSEYS.** | | | | |
| Queensland Agricultural College | Gatton .. .. | 2 | 2 | Eligible but no Herd Book in Queensland |

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| **HOLSTEINS.** | | | | |
| Queensland Agricultural College | Gatton .. .. | 3 | 10 | Holstein-Friesian Herd Book of Australia |
| George Newman .. | Wyreema .. .. | 9 | 37 | ditto |
| F. C. G. Gratton .. | Towlerton, Kingsthorpe | 2 | 11 | Eligible for entry in Holstein-Friesian Herd Book of Australia |
| State Farm .. .. | Kairi .. .. .. | 1 | 2 | ditto |
| R. S. Alexander .. | Glenlomond Farm, Columboola | 3 | 1 | Holstein Friesian Herd Book of Australia |
| S. H. Hosking .. | Racing Plains, Toogoolawah | 2 | 23 | ditto |
| C. Behrendorff .. | Inavale Stud Farm, Bunjurgen, *via* Boonah | 5 | 10 | ditto |
| **ILLAWARRA.** | | | | |
| John Hardcastle .. | Dugandan .. .. | 5 | 17 | Illawarra Herd Book of Queensland |
| Hunt Bros. .. .. | Maleny .. .. | 3 | 62 | ditto |
| W. F. Savage .. | Ramsay .. .. | 2 | 29 | ditto |
| G. E. J. Chaseling .. | Brundah, Coolabunia | 1 | 45 | ditto |
| P. Biddles .. .. | Home Park, Netherby | 3 | 14 | ditto |
| A. N Webster .. | Yaralla, Maleny .. | 5 | 65 | ditto |
| A. Pickels .. .. | Blacklands, Wondai | 4 | 79 | ditto |
| J. P. Perrett & Son .. | "Corndale," Illawarra Stud, Coolabunia, *viâ* Kingaroy | 4 | 52 | ditto |
| H. Marquardt .. .. | Oak Villa Stud, Wondai | 5 | 20 | ditto |
| Wm Wyper .. .. | "Strathobi," Maleny, Landsborough | 3 | 100 | ditto |
| **MILKING SHORTHORNS.** | | | | |
| A. Rodgers .. .. | Torrans Vale, Lanefield | 3 | 18 | Milking Shorthorn Herd Book of Queensland |
| Wm. Rudd .. .. | Airedale, Christmas Creek, Beaudesert | 6 | 30 | ditto |
| W. Middleton .. .. | Devon Court, Crow's Nest | 3 | 27 | ditto |
| P. Young .. .. | Talgai West, Ellinthorp | 11 | 60 | ditto |
| McFarlane Bros. .. | Kilbirnie Stud Farm, Radford | 4 | 37 | ditto |
| **SHORTHORN.** | | | | |
| C. E. McDougall .. | Lyndhurst, Warwick | 25 | 50 | Entered or eligible Q.H.B. |
| W. B. Slade .. .. | East Glengallan, Warwick | 77 | 283 | Queensland Shorthorn Herd Book |
| W. T. Scrymgeour .. | "Tara," Arthur st., Toowoomba | 79 | 300 | ditto |
| T. B. Murray-Prior .. | Maroon, Boonah .. | .. | 17 | Queensland Shorthorn Herd Book |
| T. B. Murray-Prior .. | Maroon, Boonah .. | 2 | 20 | Australian Herd Book |

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| **HEREFORD.** | | | | |
| H. F. Elwyn .. .. | Gunyan, Inglewood | 250 | 750 | Australian Hereford Herd Book |
| Mrs. Lumley Hill .. | Bellevue .. .. | 45 | 127 | Entered or eligible for entry A.H.H.B. |
| James T. Turner .. | The Holmwood, Neurum | 25 | 50 | Australian Hereford Herd Book |
| A. J. McConnel .. | Dugandan, Boonah | 43 | 60 | ditto |
| **ABERDEEN ANGUS.** | | | | |
| G. C. Clark .. .. | East Talgai, Ellinthorp | 4 | 10 | Entered or eligible for N.Z.H.B. |
| **SUSSEX.** | | | | |
| James T. Turner .. | The Holmwood, Neurum | 2 | 4 | Sussex Herd Book |

## ELEPHANT GRASS.

We have received from Mr. W. Brotherton, Gladstone, the accompanying excellent photograph of his crop of Elephant grass. Dairymen and stock-raisers, he says, need not fear any loss of stock through drought if they would only plant this prolific fodder plant. We have had, a little while since, inquiries as to where seed or plants of Elephant grass can be obtained. Mr. Brotherton can supply both.

## A "MILK IMPROVER."

Mr. William Lawton, secretary of the Society of Medical Officers of Health (England), claims to have invented a "milk improver," which he claims will convert a pint of milk, costing 3d., into a quart for the cost of another penny. At a demonstration Mr. Lawton described his "milk improver" as a synthetic powder extracted from grass and herbs and ordinary cattle food. To make a quart of "milk," Mr. Lawton mixes 2 drachms of the powder into a thin paste with cold water, pours over it a pint of boiling water, and boils the whole for five or six minutes. A pint of cow's milk is then added, and the mixture again brought to

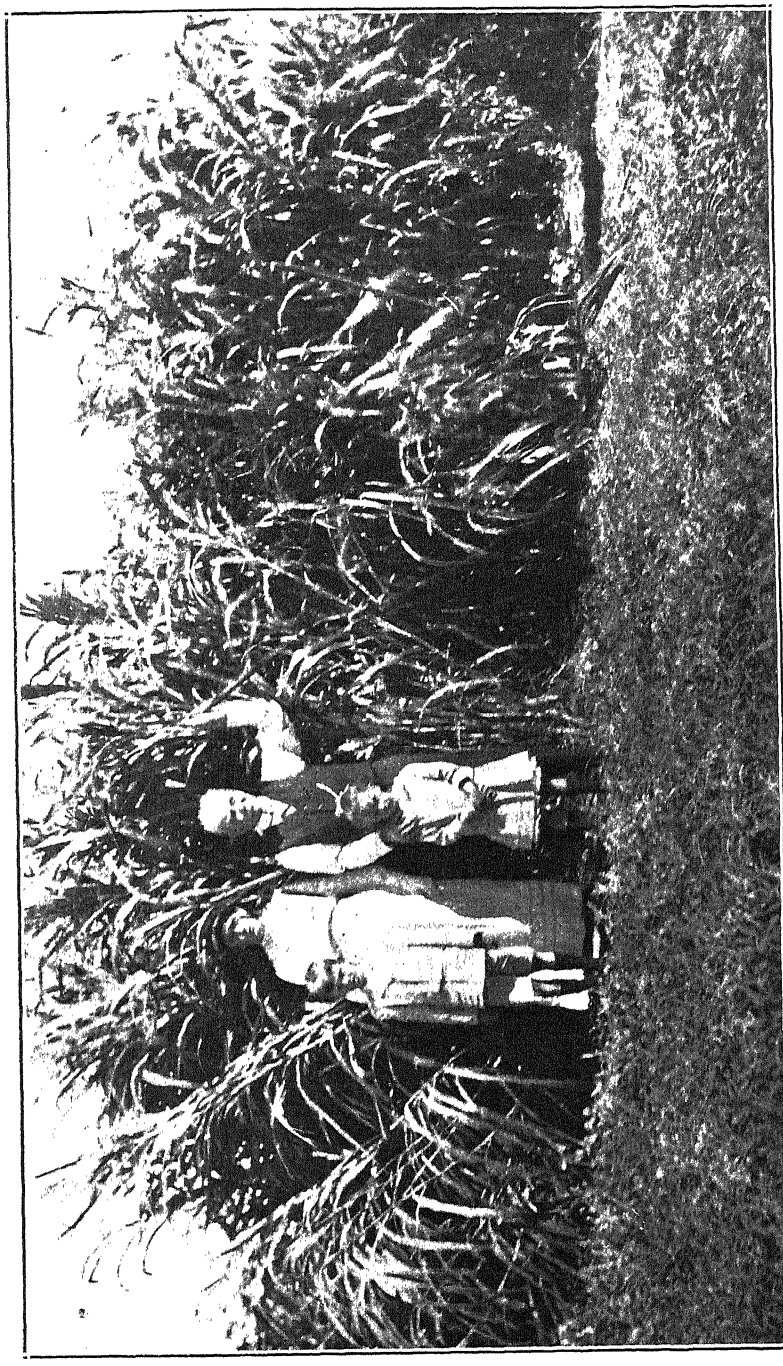


PLATE II.—ELEPHANT GRASS ON MR. W. BROTHERTON'S FARM, GLADSTONE.

the boil, strained, and allowed to cool, when it is ready for use. The result is a quart of liquid unrecognisable in taste from ordinary milk. Mr. Lawton claims that his "milk" is richer than cow's milk; and when a jugful was compared with the same amount of pure milk, it was found that a greater coating of cream was on the top of the mixture.

"My aim in composing the milk substitute," said Mr. Lawton to a Press representative, "is to help the housewives of England. In fact, the women worried me into doing it. The 'milk improver' is being made under my supervision by a big firm of chemical mixers, and it will be supplied to members of the Brittania League of Housewives in 2-drachm packets. The 4,000 members of the league are testing the milk substitute, a week's supply of which will be provided at cost price on the receipt of an undertaking to reduce the daily milk supply by one-half, and make up the quantity with my powder."—"New Zealand Farmer."

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## THE JERSEY-HEREFORD COW.

In April, 1910, we gave an illustration of Mr. Munro Hull's Jersey-Hereford cow "Spot" (*Q.A.J.*, Vol. xxiv., part 4), whose dam, "Brownie," was a Hereford, and the sire was a Jersey. Mr. Hull bred thirteen calves from "Brownie," only two of which were heifers. The idea of the cross was to introduce stamina to a Jersey strain. The late Mr. P. R. Gordon expressed the opinion that the cross would be unsuitable for dairy purposes. It will be of interest to many of our readers to note the results which we have received from Mr. Hull.

The cow "Spot" referred to was born in 1904, and died during the drought of 1915, leaving behind five daughters, five grand-daughters, and one great-granddaughter. She had ten calves—six born in the month of May, two in April, and two in June—a fairly regular record, not missing once from 1906 to 1915. "Spot's" test was 4·00, and her record 4 gallons for the day. None of her heifers test below 4, and one goes 5·1—all equally good milkers.

With one exception, none of her descendants show more than faint traces of Hereford. One is "bally," and the others carry either a white speck or a "boomerang" in white over the eyebrow; the body colour a uniform yellow. Temperament, wholly Jersey. "Spot" had five bull calves, and out of fifteen grandchildren born to date, ten are bulls. Is this a Hereford peculiarity?* "Spot's" eldest daughter has calved yearly since 1909. Her second daughter missed once (1915) since 1911. Her third calved in 1915, and was dried off in February last.

As regards stamina, not a single beast out of the twenty-six head bred from this cow and her progeny died from disease.

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*No.—Ed. "*Q.A.J.*"

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, FEBRUARY 28 TO MARCH 31, 1917.

Four thousand five hundred and forty eggs were laid during the period from 28th February to 31st March. This concludes the competition. The prizes for the highest aggregate are won by the following:—First—Miss M. Hinze, 1,542 eggs; second—T. Fanning, 1,530 eggs; third—J. Zahl, 1,516 eggs. The following are winners in the single hen competition:—Dixie Egg Plant, 291 eggs; Miss Hinze, 289 eggs; while J. M. Manson (2 hens) and Mrs. Jobling divide the third prize with 276 eggs each. Mr. Manson wins the monthy prize with 132 eggs. A full report on the whole of the competition will be issued later. The following are the individual records:—

| Competitors. | Breed. | March. | Total. |
|---|---|---|---|
| *Miss M. Hinze | White Leghorns | 124 | 1,542 |
| *T. Fanning | Do. | 113 | 1,530 |
| *J. Zahl | Do. | 110 | 1,516 |
| *J. Manson | Do. | 132 | 1,500 |
| *A. T. Coomber | Do. | 88 | 1,475 |
| J. R. Wilson | Do. | 70 | 1,462 |
| Geo. Tomlinson | Do. | 64 | 1,440 |
| G. H. Turner | Do. | 68 | 1,438 |
| W. Meneely | Do. | 34 | 1,418 |
| *E. A. Smith | Do. | 88 | 1,410 |
| *J. H. Gill, Victoria | Do. | 126 | 1,395 |
| *A. E Walters | Do. | 73 | 1,387 |
| A. Howe, N.S.W. | Do. | 69 | 1,386 |
| *W. H. Knowles, junr. | Do. | 104 | 1,380 |
| Mrs. J. R. D. Munro | Do. | 83 | 1,372 |
| J. M. Manson | Black Orpingtons | 87 | 1,366 |
| Dr. E. C. Jennings | White Leghorns | 45 | 1,362 |
| *Dixie Egg Plant | Do. | 106 | 1,354 |
| *J. F. Dalrymple, N.S.W. | Rhode Island Reds | 104 | 1,344 |
| A. W. Bailey | White Leghorns | 64 | 1,342 |
| Geo. Prince | Do. | 76 | 1,337 |
| *E. F. Dennis | Do. | 49 | 1,319 |
| A. H. Padman, S.A. | Do. | 66 | 1,314 |
| H. W. Broad | Do. | 62 | 1,313 |
| Cowan Bros., N.S.W. | Do. | 57 | 1,304 |
| Mrs. W. D. Bradburne, N.S.W. | Do. | 31 | 1,297 |
| R. Burns | S. L. Wyandottes | 84 | 1,291 |
| *Mrs. J. H. Jobling, N.S.W. | Black Orpingtons | 64 | 1,288 |
| E. Peacock | White Leghorns | 55 | 1,286 |
| W. Purvis, S.A. | Do. | 72 | 1,284 |
| F. Clayton, N.S.W. | Do. | 47 | 1,281 |
| E. F Dennis | Black Orpingtons | 71 | 1,280 |
| T. Taylor | White Leghorns | 28 | 1,275 |
| W. Lyell | Do. | 45 | 1,274 |
| *E. West | Do. | 73 | 1,270 |
| *C. Knoblauch | Do. | 53 | 1,267 |
| T. E. Jarman, N.S.W. | Do. | 37 | 1,261 |
| T. Fanning | Black Orpingtons | 65 | 1,258 |
| T. B. Hawkins | White Leghorns | 37 | 1,261 |
| King and Watson, N.S.W. | Do. | 61 | 1,256 |
| P. Brodie | Do. | 45 | 1,255 |
| A. F. Camkin, N.S.W. | Do. | 55 | 1,251 |

## EGG-LAYING COMPETITION—*continued.*

| Competitors. | Breed. | March. | Total. |
|---|---|---|---|
| Cowan Bros., N.S.W. ... ... ... | Black Orpingtons ... | 75 | 1,242 |
| G. W. Holland ... ... ... | White Leghorns ... | 57 | 1,240 |
| H. Jobling, N.S.W. ... ... ... | Black Orpingtons .. | 47 | 1,232 |
| Mars Poultry Farm ... ... ... | Black Orpingtons ... | 74 | 1,225 |
| Kelvin Poultry Farm ... ... ... | White Leghorns ... | 23 | 1,225 |
| Mars Poultry Farm ... ... ... | Do. ... ... | 36 | 1,221 |
| J. Anderson, Victoria ... ... .. | Do. ... ... | 44 | 1,215 |
| *W. L. Forrest, N.S.W.... ... ... | Do. ... ... | 68 | 1,213 |
| W. Becker... ... ... ... ... | Do. ... ... | 43 | 1,203 |
| H. Hammill, N.S.W. ... ... ... | Do. ... ... | 96 | 1,202 |
| W. Hirst, N.S.W. ... ... ... | Do. ... ... | 34 | 1,186 |
| Mrs C. Davis ... ... ... ... | Do. ... ... | 21 | 1,174 |
| Moritz Bros., S.A. ... ... ... | Do. ... ... | 71 | 1,163 |
| J. G. Richter ... ... ... ... | Do. ... ... | 27 | 1,159 |
| *Kelvin Poultry Farm ... ... ... | Do. ... ... | 46 | 1,153 |
| *J. H. Madrers, N.S.W. ... ... | Rhode Island Reds ... | 53 | 1,153 |
| *J. W. Macrae ... ... ... ... | Black Orpingtons ... | 68 | 1,143 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 50 | 1,141 |
| C. P. Buchanan ... ... ... ... | White Leghorns .. | 45 | 1,138 |
| Harveston Poultry Farm ... ... | Do. ... ... | 53 | 1,115 |
| R. Burns ... ... ... ... ... | Black Orpingtons ... | 34 | 1,115 |
| S. B. Tutin ... ... ... ... ... | White Leghorns ... | 14 | 1,090 |
| J. Gosley ... ... ... ... ... | Do. ... ... | 62 | 1,087 |
| W. Lindus, N.S.W. ... ... ... | Do. ... ... | 54 | 1,085 |
| *J. Anderson, Victoria ... ... ... | Red Sussex ... ... | 57 | 1,077 |
| F. W. Leney ... ... ... ... | White Leghorns ... | 37 | 1,063 |
| A. T. Coomber .. ... ... ... | Sicilian Buttercups ... | 74 | 1,059 |
| L. K. Pettit, N.S.W. ... ... ... | White Leghorns ... | 44 | 1,039 |
| W. H. Forsyth, N.S.W. .. ... | Black Orpingtons ... | 51 | 999 |
| E. F. Dennis ... ... ... ... | White Wyandottes ... | 77 | 948 |
| F. W Leney ... ... ... ... | Rhode Island Reds ... | 19 | 915 |
| Totals ... ... ... .. | ... | 4,540 | 91,861 |

* Indicates that the pen is taking part in single hen test.

## RESULTS OF SINGLE HEN TEST.

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| Miss M. Hinze ... ... ... | 266 | 223 | 289 | 241 | 270 | 253 | 1,542 |
| T. Fanning ... ... ... ... | 275 | 266 | 272 | 261 | 227 | 229 | 1,530 |
| J. Zahl ... ... ... ... ... | 258 | 270 | 216 | 262 | 259 | 251 | 1,516 |
| J. M. Manson ... ... ... | 224 | 276 | 239 | 242 | 276 | 243 | 1,500 |
| A. T. Coomber ... ... ... | 263 | 271 | 243 | 231 | 231 | 236 | 1,475 |
| E. A. Smith ... ... ... | 255 | 269 | 239 | 265 | 199 | 183 | 1,410 |
| J. H. Gill ... ... ... ... | 214 | 237 | 238 | 267 | 212 | 227 | 1,395 |
| W. H. Knowles, junr. ... ... | 201 | 233 | 238 | 202 | 261 | 215 | 1,380 |
| Dixie Egg Plant ... ... ... | 291 | 269 | 265 | 269 | ... | 260 | 1,354 |
| J. F. Dalrymple ... ... ... | 198 | 236 | 236 | 196 | 265 | 213 | 1,344 |
| A. E. Walters ... ... ... | 241 | 275 | 229 | 203 | 239 | 200 | 1,387 |
| E. F. Dennis ... ... ... | 200 | 237 | 184 | 265 | 233 | 200 | 1,319 |
| Mrs. Jobling ... ... ... | 211 | 276 | 197 | 202 | 194 | 208 | 1,288 |
| E. West ... ... ... ... | 234 | 235 | 206 | 205 | 189 | 201 | 1,270 |
| C. Knoblauch ... ... ... | 191 | 235 | 223 | 189 | 205 | 224 | 1,267 |
| W. L. Forrest ... ... ... | 240 | 237 | 62 | 185 | 255 | 234 | 1,213 |
| Kelvin Poultry Farm ... ... | 193 | 167 | 159 | 194 | 266 | 174 | 1,153 |
| J. H. Madrers ... ... ... | 150 | 223 | 224 | 215 | 165 | 176 | 1,153 |
| J. W. Macrae ... ... ... | 157 | 232 | 214 | 222 | 148 | 170 | 1,143 |
| J. Anderson ... ... ... | 202 | 166 | 232 | 114 | 196 | 167 | 1,077 |

# General Notes.

## WINTER CEREALS AT ROMA STATE FARM.

In the March issue of the Journal the number of rainfalls was given as "thirty-seven." This should have read "thirty-two." The correction reached us too late for publication.

## WHAT A FOUR-MILLION ARMY MEANS.

In an address given in London a few months ago, Mr. Herbert N. Casson gave some idea of what a four-million army means. He said Britain's little army of 275,000 became 4,000,000 in such quick time that we could not count the men as they came in. Four million soldiers meant one soldier for every acre in Yorkshire, one for every two houses in Great Britain, and thirty-three for every square mile. We had now an army which, marching four abreast, would be 760 miles long. Let every man carry 500 sovereigns, and there we had the army and the cost—an army which would reach from Land's End to John o' Groats. We could stand our army round the coastline, elbows touching, and with every man bearing his own weight of silver we had the cost.

## THE PROTECTION OF MIGRATORY BIRDS IN CANADA.

Many years ago, when agricultural settlement in Queensland was in its infancy, and dense scrubs, rivers, lakes, and plains were the homes of vast numbers of game birds, it was no uncommon sight to see thousands of wild ducks, black swans, geese, plain and scrub turkeys, quail, plover, pigeons, and hosts of useful insectivorous birds in all directions. The lakes at Noosa, particularly Lake Cootharaba, were the homes of countless water-fowl; the scrubs still standing on the banks of the Brisbane, Bremer, Albert, Logan, Burnett, and Northern rivers were alive with birds. In the Far North wild geese could be seen in great numbers; and Torres Strait pigeons darkened the air at certain seasons of the year. Everywhere, even in close vicinity to the coastal towns, game was plentiful. There was then, unfortunately, no Native Birds Protection Act in force; and as immigration increased the destruction of the scrubs and the settlement of hundreds of farmers on the rivers and lakes resulted in the indiscriminate destruction of not only game birds, but of the smaller insectivorous birds, the decrease in the numbers of the latter being the primary cause of the increasing number of insect pests in our agricultural districts, orchards, and gardens.

In the "Agricultural Gazette" of Canada of December, 1916, we are given "An Account of the International Treaty of 1916 between Great Britain and the United States for the Protection of Migratory

Birds in the United States and Canada," by C. Gordon Hewitt, D.Sc., Dominion Entomologist, who writes—

"For many years the numbers of our migratory birds, such as ducks, geese, insectivorous birds, and shore birds—which class includes the plovers, sandpipers, snipe, woodcock, &c.—have been decreasing. This decrease is a matter of common knowledge and observation throughout the Dominion. Certain of these migratory birds—such as the Eskimo plover, which formerly existed in enormous numbers and was killed for the market, the Labrador duck, the passenger pigeon, and the great auk—have now become extinct. Others—such as the whooping crane and the wood duck, the most beautiful of our native ducks—have become so reduced in numbers as to render their continued existence without further protection a matter of doubt.

"From a national standpoint the prospect of this continued decrease involved serious economic considerations. Leaving out of account the value from an æsthetic point of view of this portion of our Canadian wild life, great as that is, and regarding it as an economic asset to the country, we were faced with the gradual reduction of our migratory wildfowl, whose value as food and as means of securing recreation are inestimable, and of our insectivorous birds, which are of even greater importance to the welfare of our agricultural interests.

Insectivorous birds constitute one of the chief natural agencies controlling insect pests affecting field crops, orchards, and forests. In field crops alone the annual loss in Canada due to the depredations of insect pests is, on a conservative estimate, not less than 125,000,000 dollars. And, with the development of the country, the damage caused by insect pests is increasing, while the numbers of insectivorous birds have been decreasing.

"The chief causes of this decrease in the numbers of our migratory birds are as follows:—Canada constitutes the chief breeding-place for the greater number of these birds. With the settlement of the country the breeding-places of many species have been destroyed. The clearing of the land has involved the clearing of the nesting sites of insectivorous birds; the draining of marshy areas and the settlement of the prairies have driven wild-fowl from their former breeding and feeding places. Such causes are, therefore, unavoidable to a large extent. On the other hand, while many of the provinces have excellent laws governing the protection of game, non-game, and insectivorous birds, it has not always been possible to give these birds adequate protection. The increase in the number of persons who carry guns and the improvement of modern sporting guns have had their effect on the abundance of wild fowl.

"Even with the strictest enforcement of protective laws, Canadians would have been unable to prevent the continued decrease of migratory birds unless the requisite protection were given to such birds during the time that they are in United States territory. In other words, our migratory birds cannot be adequately protected from continued decrease without co-operative protection in Canada and the United States.

"It is a well-known fact that while some of the States of the Union had excellent laws, which they enforced, others failed to protect their birds. In some States the shooting of wild fowl in the spring was permitted; this involved the killing of birds, usually mated at that time of the year, on their way to their breeding-grounds in the North. This discouraged many Canadians, who naturally asked why they should protect their wild fowl for the market gunners in the South. The existence of such market gunners, who annually killed enormous quantities of Canadian-bred ducks and geese for the markets of the big cities in the United States, constituted one of the greatest causes of reduction and one of the chief obstacles to any rational attempt to prevent such reduction and to maintain our stock of wild fowl. Not only were game birds affected, but insectivorous birds were likewise killed by thousands during their winter sojourn in the South; this destruction has been particularly serious in the case of the robin, one of our important cutworm destroyers.

"As a result of the efforts of sportsmen, game protective associations, and other organisations interested in the conservation of the wild fowl and other migratory birds in the United States, the Federal Migratory Bird Law was enacted in 1913, for the purpose of securing more adequate protection for migratory birds which, by reason of their migratory habits, could not be successfully protected by the efforts of individual States so long as other States were derelict in the matter. The objects of the Federal regulations were:—To reduce the open seasons, which varied greatly in different States; to secure a more uniform open season, not exceeding three and a-half months, fixed in accordance with local conditions, so that the sportsmen would have shooting at the best time of the year; and to prevent the shooting of migratory birds in the spring. A close season for a period of years was given to certain birds, particularly shore birds, and the shooting of insectivorous birds was entirely forbidden. The majority of the States amended their laws to conform with the Federal Regulations, and although certain States, in which the influence of the market hunter and gunners with no thought of the future appeared to predominate, objected to Federal interference, the outcome of this increased protection and elimination of spring shooting has been a noticeable increase in the numbers of wild fowl. This increase has also been observed by Canadian sportsmen.

"The treaty was signed in Washington on 16th August, 1916, by His Majesty's Ambassador, Sir Cecil Spring-Rice, G.C.V.O., and the Secretary of State of the United States, Mr. Robert Lansing. On the unanimous vote of the Committee on Foreign Relations, it was ratified by the Senate of the United States on 29th August, 1916.

"Of the eight articles of the treaty, the most important provision is Article II., providing for:—(1) A close season on migratory game birds from 10th March to 1st September, with the exception given; (2) an open season of three and one-half months; and (3) a close season throughout the year on insectivorous birds. The open season of three and one-half months may be fixed anywhere between 1st September and 10th

March to suit the local conditions. The restriction of the open season on wild fowl to three and one-half months will involve in some provinces a shortening of the present open season, but, in view of the objects of the treaty and the experience that such restriction in the United States is increasing the supply of birds, this change will undoubtedly meet with the support of sportsmen desirous of preventing the continued decrease in the numbers of wild fowl.

"The conclusion of this convention constitutes the most important and far-reaching measure ever taken in the history of bird protection. Some years ago efforts were made to secure the international protection of birds in Europe; but, while the general movement towards better protection for insectivorous birds was thereby furthered, the requisite co-operation on the part of all the countries interested was hampered by inactivity on the part of some of the Governments and a considerable diversity of interests and opinion. Fortunately, many of these difficulties do not exist in North America, and in the United States and Canada there is an ever-growing sentiment in favour of preserving what is left of our former wealth of wild life, which has been so seriously depleted by improvidence in the past. This international measure will affect over one thousand species and subspecies of birds from the Gulf of Mexico to the North Pole, and we may confidently look forward to not merely a cessation of the decrease, but to an increase of our migratory birds, which are so valuable a national asset."

## QUEENSLAND AGRICULTURAL JOURNAL—FEBRUARY, 1916.

Our thanks are due to the undermentioned subscribers for their response to our request for spare copies of the above issue of the Journal:—

C. F. Dennis, Hawthorne road, Bulimba.
H. Reese, Canberra Springs, Eukey, *viâ* Ballandean.
Subscriber, Flagstone Creek, *viâ* Helidon.
H. Crewther, Baking Board, Western Line.
A. Walls, Flagstone Creek, *viâ* Helidon.
Wm. E. Stacey, Allambie Farm, Mount Perry,
"Cardwell" (anonymous).

## JELLY MADE FROM COTTON BOLLS.

A lady in Florida, U.S.A., has sent to the Commissioner for Agriculture at Tallahassee samples of jelly made from cotton bolls and buds. It is well flavoured, and resembles somewhat in colour and taste jelly made from guavas.—"Cotton and Cotton Oil News."

[With cotton at 20 cents (10d.) per lb., we are inclined to think that it would pay better to let the cotton mature and utilise the waste for the manufacture of high explosives.—Ed. "*Q.A.J.*"]

## A FINE CROP OF RHODES GRASS.

Mrs. J. Adams, of Henley Park, Yalleroi, sends us a photograph and description of Rhodes grass grown on her grazing farm at Henley Park, Yalleroi. Planted last spring, it is now over 5 ft. high and just shedding its seeds (16th March). The grass was planted according to the manner advocated in the *Queensland Agricultural Journal*—viz., scattering the seeds in ashes—and proved a great success. At the time of writing it was throwing out runners, and rapidly travelling over the ground during the wet weather. The photograph shows what can be done in the way of growing artificial grasses in the Yalleroi district on the so-called desert country, where the summer heat is intense. Yalleroi is 348 miles west of Rockhampton. We regret that the halation on the lower half of the photograph will not admit of its being reproduced in the Journal.

## QUEENSLAND SHOW DATES FOR 1917.

We have received from Mr. J. Bain, hon. secretary of the Queensland Chamber of Agricultural Societies, the following list of Queensland show dates for 1917 allotted by the Chamber:—

Goombungee A.H. and P. Society (J. J. Morgan, secretary), 7th March.

Chinchilla A. and P. Association (W. L. Archer, secretary), 10th and 11th April.

Toowoomba—Royal Agricultural Society of Queensland (G. Noble, secretary), 24th to 26th April.

Esk—Toogoolawah P.A. and I. Association (T. C. Pryde, secretary), 1st and 2nd May,

Pomona—Noosa A.H. and I. Society (H. Robinson, secretary), 2nd and 3rd May.

Nanango A.P. and M. Society (S. Cavaye, secretary), 2nd and 3rd May.

Charleville—Central Warrego P. and A. Association (T. C. Fallis, secretary), 8th and 9th May.

Lowood and Tarampa P. and A. Association (W. E. Michel, secretary), 9th and 10th May.

Kingaroy A.P. and I. Society (R. A. Pearse, secretary), 9th and 10th May.

Springsure P. and A. Society (W. Fisher, secretary), 9th and 10th May.

Mitchell—Maranoa P.A. and I. Association (T. E. Shannon, secretary), 15th and 16th May.

Wondai A.P. and I. Society (H. J. Compagnoni, secretary), 16th and 17th May.

Boonah—Fassifern A. and P. Association (J. McKenzie, secretary), 16th and 17th May.

Roma—Western P. and A. Association of Queensland (H. M. Campbell, secretary), 22nd and 23rd May.

Mackay—Pioneer River Farmers and Graziers' Show Association (Frank Black, secretary), 22nd and 23rd May.

Ipswich—Queensland P. and A. Society (G. W. Allen, secretary), 23rd and 24th May.

Kilkivan P.A. and I. Association (M. O. Aronsten, secretary), 23rd and 24th May.

Maryborough—Wide Bay and Burnett P. and A. Society (H. A. Jones, secretary), 29th to 31st May.

Beaudesert—Logan and Albert A. and P. Society (M. Selwyn Smith, secretary), 30th May.

Marburg A. and I. Association (F. H. Bielefeld, secretary), 2nd and 4th June.

Gayndah P.I.A. and H. Society (E. M. Stephensen, secretary), 5th and 6th June.

North Pine—The Pine River A.H. and I. Association (G. Armstrong, secretary), 8th and 9th June.

Woombye—North Coast A. and H. Society (E. E. McNall, secretary), 6th and 7th June.

Gin Gin A.P. and I. Society (Chas. M. Morris, secretary), 13th and 14th June.

Rockhampton Agricultural Society (H. Hill, secretary), 21st to 23rd June.

Nambour—Maroochy P.A.H. and I. Society (J. J. Wilkinson, secretary), 4th and 5th July.

Lockyer A. and I. Society (F. Roberts, secretary), 4th and 5th July.

Biggenden A. and P. Society (C. J. Stephenson, secretary), 5th and 6th July.

Crow's Nest A.H. and I. Society (W. B. Carlile, secretary), 10th and 11th July.

Charters Towers—Towers P.A. and M. Association (A. H. Pritchard, secretary), 10th and 11th July.

Kilcoy P.A. and I. Society (H. G. Fien, secretary), 12th and 13th July.

Barcaldine P.A. and H. Society (W. J. R. Chambers, secretary), 24th and 25th July.

Rosewood A. and H. Association (A. J. Loveday, secretary), 25th and 26th July.

Woodford A.P. and I. Association (G. H. Osmond, secretary), 26th and 27th July.

Dalby P. and A. Association (James Hunter, secretary), 1st and 2nd August.

Caboolture P.A. and I. Society (C. V. Hemming, secretary), 2nd and 3rd August.

Brisbane—National A. and I. Association of Queensland (J. Bain, secretary), 13th to 18th August.

Gympie A.M. and P. Society (F. W. Shepherd, secretary), 29th and 30th August.

Bundaberg A.P. and I. Society (Redmond Bros., secretaries), 6th and 7th September.

Clifton—Darling Downs P.A. and I. Association (P. G. A. Murphy, secretary), 12th and 13th September.

Zillmere A.H. and I. Society (A. B. Marquis, secretary), 22nd September.

Beenleigh—A. and P. Society of Southern Queensland (R. Newburn, secretary), 27th and 28th September.

Mt. Gravatt—Mt. Gravatt and District A. H. and I. Society (H. Trim, hon. secretary), 8th September.

Cleveland—Cleveland A. H. and I. Society (E. Lewis, hon. secretary).

Coorparoo—Coorparoo Horticultural and Industrial Progress Association (W. D. Dell, hon. secretary), 1st September.

Mackay—Pioneer River Farmers and Graziers' Association (P. T. Dunworth, secretary).

Ingham—Herbert River P. and A. Association (R. L. Jones, secretary), 31st August and 1st September.

Wellington Point—Wellington Point A. H. and I. Association (R. C. Flitcroft, secretary), 24th November.

Mundowran—Mundowran Pocket Farmers' Association (A. J. C. Mathieson, secretary).

Oakey Creek, *viâ* Eumundi—Kenilworth Farmers' Association (G. B. Sutton, Secretary).

# Answers to Correspondents.

GEOLOGIST, Cairns—

Your question as to the origin of the Stassfurt potash deposits, and your suggestion that similar deposits might exist in some portion of Queensland, involve a lengthy explanation. Some time ago we received the following paper from an unknown correspondent, who did not, however, state the source of his information:—

## THE ORIGIN AND GEOLOGICAL FORMATION OF THE STASSFURT POTASH DEPOSITS.

The Stassfurt salt and potash deposits, according to the generally accepted theory of Herr Lierke, the agricultural chemist to the "Verkaufs-Syndicat der Kalkwerke," originated as follows:—These deposits had their origin thousands of years ago in a sea or ocean, the waters of which gradually receded, leaving, near the coast, lakes which still retained communication with the great ocean by means of small channels. In that part of Europe the climate was then tropical, and the waters of these lakes rapidly evaporated, but were constantly replenished through small channels connecting them with the main body. Decade after decade this continued until, by evaporation and crystallisation, the various salts present in the sea water were deposited in solid form. The less soluble material, such as sulphate of lime or anhydrite, solidified first, and formed the lowest stratum. Then came common rock-salt with a slowly thickening layer, which ultimately reached 3,000 ft., and is estimated to have been 13,000 years in formation. This rock-salt (slow formation) is interspersed with lamellar deposits of anhydrite, which gradually diminish toward the top, and are finally replaced by mineral polyhalite, which is composed of sulphate of lime, sulphate of potash, and sulphate of magnesia. The situation in which the polyhalite predominates is called the "Polyhalite Region," and after it comes the "Kieserit Region," in which, between the rock-salt strata, kieserit (sulphate of magnesia) is embedded. Above the kieserit lies the potash region, consisting mainly of carnallit, a mineral compound of muriate of potash and chloride of magnesia. The carnallit deposit is from 50 to 130 ft. thick, and yields the most important of the crude potash salts, and that from which are manufactured most of the concentrated articles, including muriate of potash. Overlying this potash region is a layer of impervious salt-clay, which acts as a watertight roof to protect and preserve the very soluble potash and magnesia salts which, had it not been for the protection of this overlying stratum, would have been long ages ago washed away and lost by the action of the water percolating from above. Above this salt-clay roof is a stratum of varying thickness of anhydrite (sulphate of lime), and, still above this, a second deposit of rock-salt (later formation), probably formed under more recent

climatic and atmospheric influences, or possibly by chemical changes in dissolving, and subsequent precipitation. The salt deposit contains 98 per cent. (or often more) of pure salt—a degree of purity rarely elsewhere found. Finally, above this are strata of gypsum, tenaceous clay, sandstone, and limestone, which crop out at the surface. At some few places, through cracks and fissures, surface water has entered and either entirely carried away the potash deposits or changed them into secondary products. Resulting from this later action are beds of kainit, sylvinit, and other less important compounds in the upper strata.

This is the generally accepted theory as to the origin and formation of these deposits, which are found so plentifully in the vicinity of the Hartz Mountains, in Germany, and nowhere else in the world, so far as is known; and the fact remains that the potash salt deposits of the Stassfurt mines are so enormous as to be practically inexhaustible.

### THE DISCOVERY OF THE POTASH DEPOSITS IN GERMANY.

In the year 1839 the Prussian Government commenced the sinking of a shaft for the purpose of mining rock-salt. In 1851 a peculiar layer of saline compounds was met with at a depth of 1,066 ft. These deposits were of great chemical value; and Mr. H. Rose, an analytical chemist, directed attention to the salt as a source for potash compounds. Acting on his suggestion, the Governments of Prussia and Saxony exploited these deposits, with the result that the potash, up to that time derived from wood ashes, seaweed, &c., was replaced by the newly discovered mineral compounds. The mines were energetically worked, and crude material extracted to the amount of 40,000 cwt. per day. Since then the Stassfurt mines have supplied the agricultural world with the potash so much needed in agriculture.

### HOW THE POTASH IS OBTAINED.

Of the crude salts in the mines, carnallit is the one that occurs in greatest quantity. Seams of pure carnallit, consisting of muriate of potash and chloride of magnesia, are occasionally met with; but, generally, the vast deposits of carnallit are interspersed with seams of rock-salt and kieserit. It is generally used in the manufacturing establishments connected with the mines for the manufacture of muriate of potash. In this process it is first roughly ground and placed in pans where it is treated with chloride of magnesia liquor, and steam is passed through it to assist in dissolving it. In this way the muriate is dissolved out, and the solution is run into large iron crystallising tanks, where it is allowed to cool for three or four days, and a muriate of potash of 60 to 75 per cent. purity crystallises out. Various measures of treatment, including washing with cold water to remove the common salt and chloride of magnesia, are further resorted to, and the product is a muriate of potash varying from 70 to 99 per cent. purity, according to the process adopted. This muriate will analyse from 44 to 56 per cent. of pure potash.

When we consider the geological conditions as above stated under which the Stassfurt salt and potash deposits were formed, the question arises whether similar conditions exist in any portion of Australia. In the Hartz region, in Germany, it appears that these deposits had their

origin in what was, thousands of years ago, the tropical region of Europe. They originated in a sea or an ocean, which gradually receded, leaving lakes, the waters of which rapidly evaporated, but were always replenished through small channels connecting them with the ocean. In the centuries the salts present in the seawater were deposited in solid form.

In South Australia there are numerous and extensive salt lakes and lagoons—some near the coast, others inland—the principal ones being Lakes Eyre, North and South, Torrens, Gairdner, Frome, and Blanche. These and others are mainly large expanses of mud, and occupy low-lying portions of the plain country. Various bores have been put down to considerable depths up to 4,000 ft. in different parts. We cannot say with what result. The fact that most of the known minerals are found in different parts of Australia gives rise to the idea that there may be areas where potash deposits may exist.

## DERIVATION OF THE WORD "SILO."

"CURIOUS," Julia Creek—

The derivation of the word "silo" was given in this Journal in April, 1911; but as you may not have a copy of that date, we give you the information you ask for:—

The silo itself means a very great deal to the dairy farmer, since by its help he can tide his stock over several months of scarcity of feed. But it seems that J.S., our correspondent, wants to know the meaning of the word—the derivation of it. Here it is. The word silo came from the Greek *siros*—a pit or hole sunk in the ground for keeping corn in. Then *siros* became Latinised into *sirus*, and in its turn *sirus* in Spanish and French was corrupted into *silos*, or, as is found in old books in those languages, *silo;* and in Spanish there is the verb *ensilor*, which signifies the putting of corn into a silo; and the French writers gave the term "ensilage" to the material thus stored away. The father of modern ensilage, M. Goffart, was practically the first to use it. As to silos and ensilage being modern inventions, it is, on the contrary, as old as the Pharaohs, and possibly Noah fed his stock in the Ark on compressed ensilage. The old naturalist, Pliny, mentions it as being known in Thrace and Cappadocia. The Roman generals in Africa and Spain (he says) dug holes in dry ground, spread chaff or stubble underneath, and laid up grain in the ear in them. Most of the Greek authors—Euripides, Theophrastus, Hesychius, and Suidas—speak of the siros or silo.

Amongst the Eastern nations ensilage has been largely used. In Barbary often 200 or 300 silos have been found together, the smallest holding 400 bushels. In Egypt a similar method has been in vogue for ages. Colonel Burnaby, in his "Ride to Khiva," and Mr. O'Donovan, in "The Merv Oasis," both refer to the subject. The colonel tells how he met a party of men and women near Khiva, who were engaged in unearthing a quantity of grass from a deep cutting in the ground. This grass had been mown the previous autumn, and was thus preserved until such time as the owner required it; the grass was as fresh as the day it was cut. It is remarkable that the Kafir word for a grain pit is *essisile*, which seems to have affinity with silo. The South Sea Islanders have long practised the ensilage of breadfruit, taro, yams, &c. The Mexicans knew all about silos centuries ago. But we could write a whole book on the subject. This will probably suffice; *but will it suffice to induce some of our farmers to rise to the wisdom of our savage ancestors and build silos?*

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MARCH, 1917.

| Article. | | MARCH. Prices. |
|---|---|---|
| Bacon | lb. | 9d. to 1s. |
| Barley | bush. | 4s. 3d. |
| Bran | ton | £4 17s. 6d. |
| Broom Millet | ,, | £22 to £24 |
| Butter | cwt. | 149s. 4d. |
| Chaff, Mixed | ton | £3 15s. to £4 |
| Chaff, Oaten | ,, | £5 to £5 10s. |
| Chaff, Lucerne | ,, | £3 5s. to £3 15s. |
| Chaff, Wheaten | ,, | £4 10s. |
| Cheese | lb. | 9½d. |
| Flour | ton | £12 |
| Hams | lb. | 1s. 3d. to 1s. 4d. |
| Hay, Oaten | ton | £4 10s. |
| Hay, Lucerne | ,, | £1 10s. to £2 5s. |
| Honey | lb. | 3¾d. to 4d. |
| Maize | bush. | 2s. 6d. to 2s. 7d. |
| Oats | ,, | 3s. to 4s. |
| Onions | ton | £7 10s. to £9 10s. |
| Peanuts | lb. | 2d. to 3d. |
| Pollard | ton | £6 12s. 6d. |
| Potatoes | ,, | £4 5s. to £7 |
| Potatoes (Sweet) | sug. bag | 1s. to 1s. 3d. |
| Pumpkins (Cattle) | ton | £2 10s to £2 15s. |
| Eggs | doz. | 1s. 2d. to 1s. 10d. |
| Fowls | pair | 2s. 9d. to 5s. |
| Ducks, English | ,, | 3s. 6d. to 4s. |
| Ducks, Muscovy | ,, | 5s. 6d. to 7s. 6d. |
| Geese | ,, | 7s. to 9s 6d. |
| Turkeys (Hens) | ,, | 9s to 12s. 6d. |
| Turkeys (Gobblers) | ,, | 18s. to 25s. |
| Wheat | bush. | 3s. to 3s. 6d. |

## VEGETABLES—TURBOT STREET MARKETS.

| | |
|---|---|
| Asparagus, per bundle | ... |
| Cabbages, per dozen | 2s. to 8s. |
| Cauliflowers, per dozen | ... |
| Celery, per bundle | ... |
| Cucumbers, per dozen | 3d. to 1s. |
| Beans, per sugar bag | 1s. to 3s. 3d. |
| Peas, per sugar bag | 4s. to 7s. 6d. |
| Carrots, per dozen bunches | 10d. to 1s. |
| Chocos, per half-case | ... |
| Beetroot, per dozen bunches | ... |
| Marrows, per dozen | 1s. 6d. to 4s. |
| Lettuce, per dozen | 1s. to 2s. |
| Parsnips, per bundle | 6d. |
| Sweet Potatoes, per sugar bag | 2s. to 2s. 6d. |
| Table Pumpkins, per dozen | 2s. to 4s. |
| Tomatoes, per quarter-case | 1s. 6d. to 3s. |
| Vegetable Marrows, per dozen | ... |
| Turnips, per dozen bunches | 10d. to 1s. |
| Rhubarb, per dozen bundles | 1s. |

## SOUTHERN FRUIT MARKETS.

| Article. | MARCH. Prices. |
|---|---|
| Bananas (Queensland), per case | 7s. to 9s. |
| Bananas (Fiji), per case | 16s. to 17s. 6d. |
| Bananas (G.M.), per case | 18s. to 19s. |
| Custard Apples, per tray | ... |
| Lemons (Local), per bushel-case | 2s. to 5s. |
| Mandarins, per case | ... |
| Mangoes, per bushel-case | ... |
| Oranges (Navel), per case | 17s. to 19s. |
| Oranges (other), per case | ... |
| Pears, per case | ... |
| Papaw Apples, per double-case | 7s. to 9s. |
| Passion Fruit, per half-bushel-case | 3s. to 6s. |
| Persimmons, per half-case | ... |
| Pineapples (Queens), per double-case | 5s. to 7s. |
| Pineapples (Ripleys), per double-case | 4s. to 6s. |
| Pineapples (Common) per double-case | 4s. to 6s. |
| Strawberries (Local), per dozen punnets* | ... |
| Tomatoes, per half-bushel-case | 1s. 4d. to 3s. |
| Granadillas, per double case | 18s. to 20s. |

* 1 punnet = 1 quart.

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | MARCH. Prices. |
|---|---|
| Apples, Eating, per case | 6s. to 11s. |
| Apples, Cooking, per case | 5s. 6d. to 7s. 6d. |
| Bananas (Cavendish), per dozen | 1d. to 3½d. |
| Bananas (Sugar), per dozen | 1d. to 3d. |
| Citrons, per hundredweight | 10s. |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per quarter-case | 3s. 6d. to 4s. 9d. |
| Custard Apples, per quarter-case | ... |
| Granadillas, per quarter-case | ... |
| Grapes, per lb. | 2d. to 4d. |
| Lemons (Lisbon), per quarter-case | 3s. to 4s. 6d. |
| Limes, per quarter-case | 3s. to 4s 6d. |
| Nectarines, per case | 1s. to 3s. |
| Oranges (Navel), per case | 9s. to 10s. |
| Oranges (other), per case | 4s. to 8s. |
| Papaw Apples, per quarter-case | 2s. to 3s. 6d. |
| Passion Fruit, per quarter-case | 3s. to 4s. |
| Peaches, per quarter-case | 1s. 3d. to 3s. 6d. |
| Pears, per case | 2s. to 3s. |
| Peanuts, per lb. | 2d. to 3d. |
| Persimmons, per quarter-case | 2s. to 4s. |
| Plums, per quarter-case | 4s. to 5s. |
| Plums (prime eating), per case | ... |
| Pineapples (Ripleys), per dozen | 1s. to 2s. 6d. |
| Pineapples (Rough), per dozen | 4d. to 1s. 3d. |
| Pineapples (Smooth), per dozen | 6d. to 2s. 6d. |
| Quinces, per quarter-case | 3s |
| Tomatoes, per quarter-case | 1s. 6d. to 3s. |
| Watermelons, per dozen | 2s. 6d. to 7s. |

## TOP PRICES, ENOGGERA YARDS, FEBRUARY, 1917.

| Animal. | FEBRUARY. Prices. |
|---|---|
| Bullocks ... ... ... ... ... ... ... | £18 7s. 6d. to £23 |
| Bullocks (Single) ... ... ... ... ... ... | ... |
| Cows ... ... ... ... ... ... ... ... | £12 5s. to £13 15s. |
| Merino Wethers ... ... ... ... ... ... ... | 34s. 9d. |
| Crossbred Wethers ... ... ... ... ... ... | 35s. 6d. |
| Merino Ewes ... ... ... ... ... .. ... | 30s. 3d. |
| Crossbred Ewes ... ... ... ... ... ... ... | 32s. 3d. |
| Lambs ... ... ... ... ... ... ... ... | 36s. |
| Pigs (Porkers) ... ... ... ... ... ... ... | ... |

## ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

### TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON

On account of the alteration of Civil (Clock) Time which took place on 1st January, it is necessary to *add one hour* to all the times given on this page till the last Sunday in March.

| 1917. | JANUARY. | | FEBRUARY. | | MARCH. | | APRIL. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 4·57 | 6·46 | 5·21 | 6·41 | 5·41 | 6·19 | 5·58 | 5·46 |
| 2 | 4·58 | 6·46 | 5·22 | 6·41 | 5·41 | 6·18 | 5·59 | 5·45 |
| 3 | 4 59 | 6·46 | 5·23 | 6·40 | 5·42 | 6·17 | 5·59 | 5·44 |
| 4 | 4·59 | 6·46 | 5·24 | 6·40 | 5·43 | 6·16 | 6·0 | 5·43 |
| 5 | 5·0 | 6·46 | 5·25 | 6·39 | 5·44 | 6·15 | 6·0 | 5·42 |
| 6 | 5·1 | 6·47 | 5·25 | 6·39 | 5·45 | 6·14 | 6·1 | 5·41 |
| 7 | 5·2 | 6·47 | 5·26 | 6·38 | 5·45 | 6·13 | 6·1 | 5·39 |
| 8 | 5·3 | 6·47 | 5·27 | 6·37 | 5·46 | 6·12 | 6·2 | 5·38 |
| 9 | 5·3 | 6·47 | 5·28 | 6·36 | 5·46 | 6·11 | 6·2 | 5 37 |
| 10 | 5·4 | 6·48 | 5·29 | 6·35 | 5·47 | 6·10 | 6·3 | 5·36 |
| 11 | 5·5 | 6·48 | 5·29 | 6·35 | 5·47 | 6·9 | 6·3 | 5·35 |
| 12 | 5·6 | 6·47 | 5·30 | 6·34 | 5·48 | 6·8 | 6·4 | 5·34 |
| 13 | 5·6 | 6·47 | 5·31 | 6·33 | 5·48 | 6·7 | 6·4 | 5·33 |
| 14 | 5·7 | 6·47 | 5·32 | 6·32 | 5·49 | 6·6 | 6·5 | 5·32 |
| 15 | 5·8 | 6·47 | 5·32 | 6·32 | 5·49 | 6·5 | 6·5 | 5·31 |
| 16 | 5·9 | 6·47 | 5·33 | 6·31 | 5·50 | 6·3 | 6·6 | 5·30 |
| 17 | 5·9 | 6·47 | 5·34 | 6·30 | 5·50 | 6·2 | 6·6 | 5·29 |
| 18 | 5·10 | 6·47 | 5·35 | 6·29 | 5·51 | 6·1 | 6·7 | 5·28 |
| 19 | 5·11 | 6 47 | 5·35 | 6·28 | 5·51 | 6·0 | 6·7 | 5·27 |
| 20 | 5·12 | 6·46 | 5·36 | 6·28 | 5·52 | 5·59 | 6·8 | 5·26 |
| 21 | 5·13 | 6·46 | 5·37 | 6·27 | 5·52 | 5·58 | 6·8 | 5·25 |
| 22 | 5·13 | 6·46 | 5·37 | 6·26 | 5·53 | 5·57 | 6·8 | 5·24 |
| 23 | 5·14 | 6·45 | 5·38 | 6·25 | 5·53 | 5·56 | 6·9 | 5·23 |
| 24 | 5·15 | 6·45 | 5·38 | 6·24 | 5·54 | 5·55 | 6·9 | 5·23 |
| 25 | 5·16 | 6·45 | 5·39 | 6·23 | 5·54 | 5·54 | 6·10 | 5·22 |
| 26 | 5·16 | 6·44 | 5·39 | 6·22 | 5·55 | 5·52 | 6·10 | 5·21 |
| 27 | 5·17 | 6·44 | 5·40 | 6·21 | 5·55 | 5·51 | 6·11 | 5·20 |
| 28 | 5·18 | 6·43 | 5·40 | 6·20 | 5·56 | 5·50 | 6·11 | 5·19 |
| 29 | 5·19 | 6·43 | ... | ... | 5·57 | 5·49 | 6·12 | 5·18 |
| 30 | 5·19 | 6·42 | ... | ... | 5·57 | 5·48 | 6·12 | 5·18 |
| 31 | 5·20 | 6·42 | ... | .. | 5·58 | 5·47 | ... | ... |

The Phases of the Moon commence at the times stated in Queensland, New South Wales, and Victoria only.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 8 | Jan., | ○ Full Moon | 5 | 42 | p.m. |
| 16 | ,, | ☽ Last Quarter | 9 | 42 | ,, |
| 23 | ,, | ● New Moon | 5 | 40 | ,, |
| 30 | ,, | ☾ First Quarter | 11 | 1 | a.m. |

There will be a total eclipse of the moon on 8th Jan before it rises in Queensland, but the moon will still be partly in the shadow of the earth for about three-quarters of an hour after it becomes visible. It will be farthest from the earth on the 9th January, and nearest on the 23rd.

| | | | | | |
|---|---|---|---|---|---|
| 7 | Feb., | ○ Full Moon | 1 | 28 | p.m. |
| 15 | ,, | ☽ Last Quarter | 11 | 53 | a.m. |
| 22 | ,, | ● New Moon | 4 | 9 | ,, |

It will be farthest from the earth on the 6th Feb., and nearest on the 21st.

| | | | | | |
|---|---|---|---|---|---|
| 1 | Mar. | ☾ First Quarter | 2 | 43 | a.m. |
| 9 | ,, | ○ Full Moon | 7 | 58 | ,, |
| 16 | ,, | ☽ Last Quarter | 10 | 33 | p.m. |
| 23 | ,, | ● New Moon | 2 | 5 | ,, |
| 30 | ,, | ☾ First Quarter | 8 | 36 | ,, |

It will be farthest from the earth on the 5th about midnight, and nearest on the 21st about 7 p.m.

| | | | | | |
|---|---|---|---|---|---|
| 7 | Apr. | ○ Full Moon | 11 | 49 | p.m. |
| 15 | ,, | ☽ Last Quarter | 6 | 12 | a.m. |
| 22 | ,, | ● New Moon | 12 | 1 | ,, |
| 29 | ,, | ☾ First Quarter | 3 | 22 | p.m. |

It will be farthest from the earth on the 2nd and on the 30th, and nearest on the 18th.

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF FEBRUARY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING FEBRUARY, 1917 AND 1916, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | | Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|---|---|---|---|---|
| | Feb. | No. of Years' Records. | Feb., 1917. | Feb., 1916. | | Feb. | No. of Years' Records. | Feb., 1917. | Feb., 1916. |
| *North Coast.* | In. | | In. | In. | *South Coast*—continued: | In. | | In. | In. |
| Atherton ... ... | 9·83 | 15 | 9·83 | 7·06 | Nambour ... ... | 9·40 | 20 | 5·58 | 3·57 |
| Cairns ... ... | 15·41 | 34 | 6·09 | 7·34 | Nanango ... ... | 4·69 | 34 | 1·68 | 2·21 |
| Cardwell ... ... | 17·13 | 44 | 22·09 | 6·33 | Rockhampton ... | 8·15 | 29 | 5·46 | 0·73 |
| Cooktown ... ... | 13·87 | 40 | 11·57 | 4·97 | Woodford ... ... | 9·80 | 29 | 3·02 | 1·91 |
| Herberton ... ... | 7·37 | 29 | 7·79 | 10·48 | | | | | |
| Ingham ... ... | 15·51 | 24 | 23·93 | 10·86 | | | | | |
| Innisfail ... ... | 22·44 | 35 | 19·20 | 11·85 | | | | | |
| Mossman ... ... | 11·48 | 4 | 17·95 | 5·33 | *Darling Downs.* | | | | |
| Townsville ... ... | 12·08 | 45 | 20·06 | 7·54 | | | | | |
| | | | | | Dalby ... ... | 2·94 | 46 | 3·45 | 4·45 |
| | | | | | Emu Vale ... ... | 2·27 | 20 | 2·73 | 5·78 |
| *Central Coast.* | | | | | Jimbour ... ... | 3·14 | 28 | 1·68 | 2·24 |
| | | | | | Miles ... ... | 2·69 | 31 | 4·12 | 3·30 |
| Ayr ... ... ... | 9·47 | 29 | 10·49 | 7·49 | Stanthorpe ... | 3·40 | 43 | 4·29 | 4·98 |
| Bowen ... ... | 8·76 | 45 | 12·04 | 6·85 | Toowoomba ... | 4·55 | 44 | 6·85 | 3·39 |
| Charters Towers ... | 4·19 | 34 | 7·45 | 8·78 | Warwick ... ... | 3·03 | 29 | 2·57 | 4·24 |
| Mackay ... ... | 11·78 | 45 | 18·49 | 4·92 | | | | | |
| Proserpine ... ... | 10·94 | 13 | 14·15 | 8·00 | | | | | |
| St. Lawrence ... | 8·34 | 45 | 10·58 | 2·19 | *Maranoa.* | | | | |
| | | | | | Roma ... ... | 3·18 | 42 | 4·88 | 1·22 |
| *South Coast.* | | | | | | | | | |
| | | | | | *State Farms, &c.* | | | | |
| Biggenden ... ... | 3·92 | 17 | 2·93 | 4·06 | | | | | |
| Bundaberg ... ... | 6·43 | 33 | 8·46 | 5·07 | | | | | |
| Brisbane ... ... | 6·63 | 66 | 1·64 | 15·21 | Bungeworgorai ... | 3·02 | 4 | 4·43 | 1·40 |
| Childers ... ... | 6·03 | 21 | 6·73 | 8·54 | Gatton College ... | 3·27 | 17 | 4·01 | 2·26 |
| Crohamhurst ... | 15·03 | 25 | 6·97 | 1·78 | Gindie ... ... | 2·68 | 17 | 6·17 | 0·48 |
| Esk ... ... ... | 6·00 | 29 | 3·89 | 6·15 | Hermitage ... | 2·33 | 10 | 2·83 | 4·55 |
| Gayndah ... ... | 4·29 | 45 | 3·11 | 3·65 | Kairi ... ... | 6·18 | 4 | 8·99 | 4·83 |
| Gympie ... ... | 6·91 | 46 | 2·84 | 3·19 | Kamerunga ... | 14·62 | 26 | 7·41 | 7·04 |
| Glasshouse M'tains | 11·07 | 8 | 3·90 | 2·55 | Sugar Experiment Station, Mackay | 10·35 | 19 | 14·80 | 6·42 |
| Kilkivan ... ... | 5·36 | 37 | 2·33 | 2·65 | Warren ... ... | 3·92 | 4 | 7·25 | 2·08 |
| Maryborough ... | 6·74 | 45 | 6·28 | 7·44 | | | | | |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for February this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
Divisional Officer.

# Farm and Garden Notes for May.

FIELD.—During this month, the principal work in the field will be the sowing of wheat, barley, oats, rye, and vetches. There is no time to lose now at this work. Potatoes should be hilled up. Cut tobacco. The last of the cotton crop should now be picked, the bushes being stripped daily after the dew has evaporated. Cotton-growers are notified that cotton-ginning and baling machinery has been installed on the premises of the Department of Agriculture and Stock in William street, where seed cotton will be received by the department from the growers, to whom an advance of 1¾d. per lb. will be paid. The cotton will then be ginned, baled, and marketed in the best market, and whatever balance to credit is shown when account sales are received will be distributed amongst the suppliers according to the amount of cotton supplied by them. Only bare expenses of preparing the shipments and freight, if the cotton is exported, will be deducted. Thus it will be seen that cotton-growers will have a sure market for their produce. Every effort should be made to ensure feed for stock during the winter by utilising all kinds of green fodder in the form of silage or hay. Those who own dairy stock will be wise to lay down permanent grasses suitable to their particular district and soil. A few acres of artificial grass, notably Rhodes grass, will support a surprisingly large number of cattle or sheep in proportion to acreage. Couch grass in the West will carry ten to twelve sheep to the acre. Coffee-picking should now be in full swing, and the berries should be pulped as they are picked. Strawberries may be transplanted. The best varieties are Pink's Prolific, Aurie, Marguerite, Annetta, Phenomenal, Hautbois, and Trollope's Victoria. Aurie and Marguerite are the earliest. In some localities, strawberry planting is finished in March, and the plants bear their first fruits in August. In others, fruit may be gathered in July, and the picking does not end until January.

KITCHEN GARDEN.—Onions which have been planted in seed beds may now be transplanted. The ground should long since have been thoroughly cleaned, pulverised, and should be rolled previous to transplanting. Onions may still be sown in the open on clean ground. In favourable weather plant out cabbages, cauliflowers, lettuce, leeks, beetroot, endive, &c. Sowings may also be made of all these as well as of peas, broad beans, kohl-rabi, radishes, spinach, turnips, parsnips, and carrots. Dig and prepare beds for asparagus.

FLOWER GARDEN.—Planting and transplanting may be carried out simultaneously during this month in showery weather; the plants will thus be fully established before the early frosts set in. Camellias and gardenias may be safely transplanted, also such soft-wooded plants as verbenas, petunias, pentstemons, heliotrope, &c. Cut back and prune all

trees and shrubs ready for digging. Dahlia roots should be taken up and placed in a shady situation out of doors. Plant bulbs such as anemones, ranunculus, snowflakes, freesias, ixias, watsonias, iris, narcissus, daffodils, &c. Tulips will not suit the Queensland climate, but hyacinths may be tried, although success is doubtful. All shades and screens may now be removed to enable the plants to get the full benefit of the air. Fork in the mulching, and keep the walks free from weeds. Clip hedges and edgings.

# Orchard Notes for May.

## THE SOUTHERN COAST DISTRICTS.

The advice given respecting the handling and marketing of citrus fruits in the last two numbers of this Journal applies with equal force to this and the following months. Do not think that you can give the fruit too much care and attention; it is not possible, as the better they are handled, graded, and packed the better they will carry, and the better the price they will realise.

Continue to pay careful attention to specking, and fight the blue mould fungus everywhere. Don't let mouldy fruit lie about on the ground, hang on the trees, or be left in the packing-shed, but destroy it by burning. Keep a careful lookout for fruit fly, and sweat the fruit carefully before packing. If this be done, there will be little fear of the fruit going bad in transit or being condemned on its arrival at Southern markets. Where the orchard has not been already cleaned up, do so now, and get it in good order for winter. Surface working is all that is required, just sufficient to keep moisture in the soil; keep down undergrowth, and prevent the packing of the surface soil by trampling it down when gathering the fruit.

Keeping the orchard clean in this manner enables any fallen fruit to be easily seen and gathered, and it need hardly be stated, what has been mentioned many times before, that diseased fruit should on no account be allowed to lie about and rot on the ground, as this is one of the most frequent causes of the spreading of many fruit pests.

May is a good month to plant citrus trees, as if the ground is in good order they get established before the winter, and are ready to make a vigorous growth in spring.

Don't plant the trees, however, till the land is ready, as nothing is gained thereby, but very frequently the trees are seriously injured, as they only make a poor start, become stunted in their growth, and are soon overtaken by trees planted later, that are set out under more favourable conditions. The land must be thoroughly sweet, and in a good state of tilth—that is to say, deeply worked, and worked down fine. If this has been done, it will probably be moist enough for planting; but should there have been a dry spell, then, when the whole has been dug and the tree set therein, and the roots just covered with fine top soil, 4 to 8 gallons of water should be given to each tree, allowed to soak in, and then covered with dry soil to fill up the hole. In sound, free, sandy loams that are naturally scrub soils, holes may be dug and the trees planted before the whole of the ground is brought into a state of perfect tilth. It is, however, better to do the work prior to planting, as it can then be done in the most thorough manner; but if this is not found possible, then the sooner it is done after planting the better. If the land has been thoroughly prepared, there is no necessity to dig big holes, and in no case should the holes be dug deeper than the surrounding ground either is or is to be worked. The hole need only be big enough to allow the roots to be well spread out, and deep enough to set the tree at the same depth at which it stood when in the nursery. Plant worked trees 24 to 25 ft. apart each way, and seedlings at least 30 ft. apart each way.

Towards the end of the month cover pineapples when there is any danger of frost; dry blady grass or bush hay is the best covering. Keep the pines clean and well worked—first, to retain moisture; and, secondly, to prevent injury from frost—as a patch of weedy pines will get badly frosted when a clean patch alongside will escape without any serious injury.

Slowly acting manures—such as meatworks manure when coarse, boiling-down refuse, farm manure, or composts—way be applied during the month, as they will become slowly available for the trees' use when the spring growth takes place; but quickly-acting manures should not be applied now.

## THE TROPICAL COAST DISTRICTS.

May is a somewhat slack month for fruit—pines, papaws, and granadillas are not in full fruit, the autumn crop of citrus fruit is over, and the spring crop only half-grown. Watch the young citrus fruit for Maori, and when it makes its appearance spray with the sulphide of soda wash. Keep the orchard clean, as from now till the early summer there will not be much rain, and if the orchard is allowed to run wild—viz., unworked and dirty—it is very apt to dry out, and both the trees and fruit will suffer in consequence.

Bananas should be kept well worked for this reason, and, though the fly should be slackening off, every care must still be taken to prevent any infested fruit being sent to the Southern markets.

Citrus fruits can be planted during the month, the remarks *re* this under the heading of the Southern Coast Districts being equally applicable here.

## THE SOUTHERN AND CENTRAL TABLELANDS.

Get land ready for the planting of new deciduous orchards, as although there is no necessity to plant so early, it is always well to have the land in order, so as to be ready to plant at any time that the weather is suitable. The pruning of deciduous trees can commence towards the end of the month in the Stanthorpe district, and be continued during June and July. It is too early for pruning elsewhere, and too early for grapes, as a general rule. Keep the orchard clean, particularly in the drier parts. In the Stanthorpe district the growing of a crop of blue or grey field peas, or a crop of vetches between the trees in the older orchards, is recommended as a green manure. The crop to be grown as a green manure should have the soil well prepared before planting, and should be manured with not less than 4 cwt. of phosphatic manure, such as Thomas phosphate, or fine bonedust, per acre. The crop to be ploughed in when in the flowering stage. The granitic soils are naturally deficient in organic matter and nitrogen, as well as phosphoric acid, and this ploughing in of a green crop that has been manured with a phosphatic manure will have a marked effect on the soil.

Lemons will be ready for gathering in the Roma, Barcaldine, and other districts. They should be cut from the trees, sweated, and cured down, when they will keep for months, and be equal in quality to the imported Italian or Californian fruit. If allowed to remain on the trees, the fruit becomes over-large and coarse, and is only of value for peel. Only the finest fruit should be cured; the larger fruit, where the skin is thicker, is even better for peel, especially if the skin is bright and free from blemish; scaly fruit, scabby, warty, or otherwise unsightly fruit is not suitable for peel, and trees producing such require cleaning or working over with a better variety, possibly both.

The remarks *re* other citrus fruit and the work of the orchard generally, made when dealing with the coast districts, apply equally well here, especially as regards handling the crop and keeping down pests.

QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## CEREAL CROPS.

### WHEAT.

#### THE SOIL.

We know that all soils are not alike—all do not contain the same plant food. If you were to sow wheat in pure sand, or potatoes on stiff yellow clay, you could not expect to get a good crop of either. For a wheat crop, the most suitable soil is one containing a certain amount of clay, constituting a clayey loam. Light calcareous soils with a due proportion of clay are also suitable. Wheat is a crop which, all over the world, gives the best results on strong soils—*i.e.*, those having a considerable admixture of clay. On this account, deep, argillaceous soils, having a large proportion of humus, combined more or less with sand or gravel, are commonly known as "Wheat Lands." Nevertheless, wheat is often successfully grown upon sandy and alluvial soils, and in Queensland on the red volcanic soils common in nearly every part of the State. This, however, is always true: Wheat can only be grown systematically—that is, as a branch of general farming—upon land that is either naturally or artificially in high condition. Wheat makes heavy demands upon the soil, and takes from it its best and most precious constituents. The red, volcanic soils owe their great value as farming lands, not so much to their intrinsic fertility as to physical qualities. They are nearly always very deep, well-drained, and their ultimate particles exist in the form of an almost impalpable powder. They are as excellent for wheat-growing as they are for lucerne and sugar-cane.

The presence of lime in the soil is necessary for the production of good wheat crops and other cereals, such as barley, oats, maize, &c. Since wheat is a deep-rooting plant, it is essential that the land be deeply ploughed. In times past this was not considered necessary on some of the farms on the Darling Downs, but the practice of sowing on land barely scratched with the plough has long since been abandoned. On our western plains, where there is a sparse rainfall when the crop most requires the aid of moisture, deeply prepared soil is needed, as well as deep cultivation. But loose tilth is not required, as the wheat crop flourishes in a firm seedbed. Rolling may be done directly after harrowing or when the crop is beginning to cover the ground. It helps to firm the surface, levels down clods, and presses the earth about the roots of the plants. But rolling should only be done in dry weather, as the soil in wet weather adheres to the roller. The effect of rolling is to promote the growth of the crops and to facilitate harvesting operations. Again, the plant cannot grow if the soil does not support it in a fixed position, while the effects of alternating rainy and dry weather are to draw the soil away and to destroy that close relation between soil and plant which is necessary for the process of vegetation. The roller counteracts this loosening effect and restores the required close contact between soil and stem, and between soil and roots, and this is especially important for the wheat crop during its growth, and also in the matter of facilitating the harvesting by levelling the ground.

## SEED.

The selection of seed is a most important matter—in fact, it may be said it is *the most important* operation in wheat-growing. In this connection, the Department of Agriculture and Stock has greatly assisted the farmer, both by importing the best varieties of seed wheat for them and also by breeding wheats at the Roma State Farm which have given excellent results.

If a farmer wishes to grow his own seed wheat, he should study the methods adopted at the State Farms, and, in a general way, proceed in this manner:—

Sow the seed on a specially prepared plat of, say, 1 acre, more or less, according to the size of the farm, and the quantity of land proposed to be put under wheat. Plough the plat early. Get it into the best possible condition, and keep it in a high state of fertility. When the wheat is in ear, go through the field and pick out and mark plants which show the qualities it is desired to perpetuate. Choose those which are well stooled, and whose heads are filled with plump grain. The straw should stand up well, and, as much as possible, be free from rust. When the wheat is ripe, cut these marked plants with a sickle, and thresh them out separately. Then, carefully screen the seed; pick it over by hand and save only the largest and plumpest grain for sowing. Next season sow the seed thus saved at the rate of 35 to 40 lb. per acre. Do the same every year, and it will be found that the wheat, so far from degenerating, will improve. It is well to locate the seed plat on a different part of the farm every year.

## SMUT AND BUNT.

Before sowing for a crop, the wheat seed must be treated in a certain manner for the prevention of smut, a fungoid disease which, unless combated, will often cause the loss of half the crop. It attacks wheat, oats, barley, rye, and many grasses. When wheat is affected, the ears are seen to be covered with a dark powder, the floral organs and their coverings are destroyed, and in their place is a mass of dark, chocolate-coloured powder, consisting of small spores. Before harvest time these blow away, and settle on the healthy ears, and remain there till seed-times, when the disease again appears.

Bunt is another fungoid disease which attacks wheat. It differs somewhat from smut, for which it is often mistaken. The evil effects are not seen till harvest time, when, if an apparently healthy ear is opened up, it will be found to contain nothing but a greasy, evil-smelling mass of black spores. If bunted grain be mixed with healthy grain, the effect is that the whole is blackened and rendered practically unsaleable.

These spores of smut or bunt remain on the wheat after it is threshed, and unless precautions are taken they will be sown along with it, and the crop will, to a certainty, be bunted or smuted. There are at least two methods adopted whereby the smut spores are destroyed. One way is to pickle the seed it is intended to sow in a solution of sulphate of copper—1 lb. of sulphate of copper in 5 gallons of water, which quantity will steep 4 bushels of wheat. The wheat may be either put into a gunny bag, which is dipped into the solution and then allowed to drain. Or, the grain may be spread out on a smooth floor, and the solution poured over it, turning it once or twice with a shovel, but this is a very wasteful way. If the dipping plan is adopted, only a minute or two is necessary for the process, in the case of a bluestone solution, on account of its corrosive action. The seed is then spread out to dry, and, if left in a thin layer over night, it is ready for sowing in the morning. The copper will have formed a thin film on the seed, which effectually destroys the smut spores which may be adhering to it, without injury to the grain.

The second method is to treat the seed with a solution of formalin at the rate of 1 lb. of formalin to 40 gallons of water, but in this case five minutes are allowed for dipping. Both methods are equally efficient. The bluestone solution may be used again and again, but the formalin is volatile, and it follows, therefore, that only the amount of formalin should be prepared that is required for immediate use, and sprinkling in this case should be preferred to dipping. Formalin is poisonous, and must be kept where there is no chance of children or others obtaining it in ignorance of its nature. One gallon of formalin solution is sufficient for 4 bushels of seed.

## RELATIVE MERITS OF FORMALIN AND BLUESTONE.

In comparing the two solutions of formalin and bluestone, it must be remembered that, as above stated, formalin is volatile and non-corrosive, while bluestone is very corrosive. The original formalin solution must be kept securely corked. The cost of either is practically

the same, and the formalin is less injurious to the grain than bluestone. The corrosive action of bluestone can be lessened by dusting powdered lime over the grain immeditely after treatment, but this prevents sowing with the drill. The destruction of a certain proportion of the seed grain is not an unmixed evil, because it will act most injuriously on those grains already somewhat damaged, and which are consequently most likely to produce a weakened plant.

### THE HOT WATER TREATMENT.

In addition to the above methods of "pickling" wheat seed, the "Hot Water Treatment" may be mentioned. For this purpose, either boilers or washtubs may be used. Two of these are required, also, a basket or, as before, a gunny bag. The latter is filled to three parts of wheat; then one of these is filled with water treated to 120 degrees Fahr., and the other with water heated to 135 degrees Fahr. A smaller vessel containing boiling water should be at hand, also a good supply of cold water. The seed to be treated is placed in a basket, gunny bag, or in a perforated kerosene tin. The vessel containing the seed is plunged into the first tub or boiler (120 deg. F.), and is moved about for a minute or two till the grain has all been warmed, lifting and lowering it several times meanwhile. A thermometer should be at hand to test the heat of the water, which must not be allowed to go lower than 120 deg. F. Then it is plunged into the second tub or boiler, in which the water has been heated to 135 deg. F. There it is left for ten minutes, and constantly moved about to agitate the grain. Should the temperature fall below 135 deg. boiling water must be added. The vessel containing the grain is then taken out and plunged into cold water, after which the grain is spread out on the barn floor to dry, when it will be ready for sowing.

### PREPARATION OF THE LAND.

The preparation of the ground for a wheat crop is very simple, yet there are still farmers who do not take any trouble to prepare the ground in such a manner as to ensure a fair crop. In some cases, they merely scratch the soil with the plough, and even, in the past, did not go beyond harrowing the seed into unploughed land. Wheat land should have two ploughings to a depth of at least 6 inches. In the United States of America, certainly, experiments in deep and shallow ploughing for wheat showed that the depth of ploughing is not of so much importance as a firm seed-bed, the upper portion of which is mellow and in good tilth, subsoiling not being considered financially profitable. Such shallow ploughing, however suitable it may be for the wheat-growing States of America, is not calculated to produce the best results in the climate of Queensland. After the first two ploughings, a first harrowing should follow and the ground be got into the best possible condition before sowing. In sowing, this may either be done broadcast or, as is now universally done, by a seed-drill. In sowing broadcast, one bushel per acre is more than sufficient. With a seed-drill 20 lb. is ample. Many farmers sow too much seed. Take the instance of 1 bushel to the acre. Fair average seed will run 800 grains, and good plump seed 700 grains to the ounce, so that a bushel of 60 lb. contains 750,000 grains. In a square acre there are 4,840 square yards, or 43,560 square feet. Thus,

a bushel to the acre means from 15 to 18 seeds per square foot. Say that one-quarter of this fails to germinate, being partly eaten by birds, partly insufficiently covered, yet we still have from 12 to 14 plants per square foot—that is, just twice as many as there should be. A seed-drill is generally constructed to sow from 35 to 40 lb. per acre, and, since the seed is all properly covered, there will be nearly as many plants per acre as with a bushel sown broadcast. What is the result of this crowding of the plants? They have to fight each other for moisture and plant food, and thus become stunted and do not stool out properly. Far better, then, to drill in only 20 lb. of seed per acre.

Now, about harrowing after sowing. The harrowing should be done crosswise to the direction in which the land was ploughed. The work will thus be more effective, and it will be better for the crop. Rolling the wheat, even when it is a foot high, is also productive of good. The rolling prevents "lodging" by consolidating the soil, and thus, by decreasing its power to supply overmuch nitrogen to the plants, results in the production of a less luxurious plant, with roots which have a firm hold of the consolidated soil. In this way the danger of lodging is avoided.

Should the great enemy of wheat—rust—make its appearance, it is well not to be in too great a hurry to cut the crop for hay, as it is quite possible that a really good grain crop may be sacrificed. Should the rust, however, unfortunately go too far, then, by all means, cut it, for it will pay as hay, whereas it will be worth nothing for grain.

The best time to sow wheat in the Southern part of the State is from April to June. March is considered the best time farther North. If early sowing is necessary, sow thin; if late, sow thicker.

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## LIME IN AGRICULTURE.

The use of lime in agriculture is of more importance than is recognised by many farmers. If there is no lime in a soil, no crop can thrive on it, as all plants require more or less of it. Lime acts in two ways. It is not a direct fertiliser, but it acts with acids in making clay soils more friable and pervious to water, and it promotes the decomposition of vegetable matter and organic manures, and the formation of nitrates in the soil. It also acts in rendering available all three of the plant foods which lie dormant in the soil. That is its chemical action. Its physical action, as we have said, is to render stiff clays easier to cultivate, and better able to supply moisture, heat, and air to the plant. It improves the texture of sandy soils, making them more compact, and better able to retain moisture and fertilisers. The time to apply lime is a little while before planting a crop. It should not be ploughed in. It is of great value in destroying insects, worms, and fungi. As to how much to use, some farmers put on from 2 to 5 tons per acre at intervals of from five to ten years. Others put on half a ton annually.

Lime may be applied in the form of burnt lime or air-slaked lime, but pulverised limestone has several advantages over these forms. Much inquiry has been made by farmers as to supplies obtainable and prices

of ground limestone, and the Department of Agriculture invited a number of firms in a position to supply the demand to quote prices for pulverised and burnt limestone.

The firms communicated with were the undermentioned:—

Messrs. Campbell and Amos, Bundaberg.
The Calcium Lime Quarries, near Townsville.
Chillagoe Limited, Cairns.
Australian Co-operative Fertilisers Company, Degilbo.
Mount Morgan G.M. Company.
Queensland Cement and Lime Company, Creek street, Brisbane.
The Proprietor, Ambrose Quarries, N.C. Line.

Four of these firms replied, and gave the following quotations:—

| — | Ground Limestone. Per ton. | Burnt Limestone. Per ton. | | |
|---|---|---|---|---|
| | In Bags – (Truck loads). | In Bags. | In Tanks. | |
| | £ s. d. | £ s. d. | | |
| The Queensland Cement and Lime Company | 1st year 1 0 0 | 2 15 0 | .. | On trucks at Gore. (Freight, Gore to Brisbane, 8s. per ton). These prices subject to reduction later. |
| Australian Co-operative Fertilisers Co. | 2 5 0 (In 6-ton truck loads) | .. | .. | |
| Campbell and Amos.. | .. | 1 10 0 | .. | Bags returnable at 3s. per dozen |
| Mount Morgan Gold Mining Company | 0 17 6 In truck loads at Marmor, cost in Gympie, 28s. 6d., Brisbane, 32s. 11d. | .. | .. £1 7s. 6d. net. | Bags returnable, at 3s. per dozen on rails, Raglan. |

A reply has since been received from Mr. H. Ambrose (Ambrose Quarries), quoting burnt lime on trucks at 35s. per ton in bags, the latter to be returned or allowed for. Lime f.o.b. Rockhampton, £2 2s. 6d. per ton in tanks, the buyer to provide tanks, or the company will supply and charge for them.

## SEVENTY BUSHELS OF OATS TO THE ACRE.

### THE "LIFTER" OAT.

Mr. W. H. Mogridge, Tannymorel, writes us in reference to a valuable variety of oats, called the "Lifter," the seed of which he obtained last year from South Australia. He speaks very highly of this new variety, of which he has seed for disposal. The "Warwick Examiner" of 21st March, contains a very interesting article, giving the history of this oat, taken from the "Adelaide Chronicle," as follows:—

"In the Myponga district this year some of the finest crops in Australia may be seen at the present time, and yields of 4 tons of hay per acre will be a common harvest. Mr. G. Hunt, of Myponga, has

what is described as one of the crop pictures of the year. It is a field of oats, from which a return of nearly 70 bushels per acre is confidently expected. Some years ago Mr. C. Forbes, of Yankalilla, imported from America a small sample of oats, which had produced wonderful crops there, and in characteristic fashion the American seedsman who supplied the sample pointed out in the printed particulars forwarded with the parcel that all who had so far planted this variety of oats had in a year or two ' lifted their mortgages' from the proceeds. Mr. Forbes dispensed the seed in small lots at the rate of about a shilling an ounce, and the enterprising farmers who obtained samples have reason to be grateful to the importer, for the new strain has yielded enormous crops on every farm on which it was planted. The process of raising enough to sow paddocks has been slow, but the corner in that respect has been rounded, and the grain will soon be found in other parts of the State. Mr. Hunt was one of the purchasers of the shilling packets about six years ago. He planted every seed—there were about sixty—and carefully harvested the crop, the result being about a gallon of splendidly-developed grains. In the following year he gathered about 1½ bushels of grain, and sowed the whole of it the next season. So prolific was the crop that he harvested at the rate of 64 bushels to the acre. With this 64 bushels in the succeeding year he planted 15 acres, and the portion reserved for grain yielded 50 bushels to the acre. This was last year, when the drought was so bad. Eight of the 15 acres were cut for hay, the balance of 7 acres giving him 151 bags of first-class seed. This year he has 80 acres under crop in different paddocks, and he expects to harvest at least 1,000 bags, in addition to cutting hay. The ' picture' crop consists of 9 acres, which stands fully 7 ft. in height. It is by far the best specimen of a crop seen this season, and Mr. Hunt says it will give nearly 70 bushels to the acre. In another paddock he has 16 acres that is about 6 ft. high, and will give over 3 tons of hay, or about 60 bushels of grain per acre. Still another fine crop, nearly 6 ft. in height, covers 27 acres, and a fourth paddock of 30 acres, which was sown later, is not out in head yet, although over 5 ft. high. Mr. Hunt's nephew at Myponga (Mr. J. Hunt) has 8 acres of the American oats alongside a field of Algerian, and the two are described as the best crops ever seen in the Southern Hemisphere. These magnificent returns are the result of a shilling investment six years ago, and as the growers have lost the name of the oats received from the seller, they have appropriately given the variety the title of ' Mortgage Lifter.' ''

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## FLAX-GROWING FOR FIBRE.

In the February issue of the Journal, we published some notes on growing flax for seed (linseed). Concerning the cultivation of the plant for the sake of the fibre, Dr. J. Vargas Eyre writes as follows in '' The Times Trade Supplement'':—

'' From the agricultural point of view no difficulty is experienced in raising flax as a fibre crop, the choice of suitable land being moderately wide. The matters of greatest consequence are that the land be clean and well prepared, and that good seed be sown. It is a crop which grows rapidly, and when sown in March or early April comes to harvest before the usual grain crops. The value of the crop when grown for fibre purposes depends largely upon the manner in which it is harvested.

The stems must be arranged parallel with one another in neat bundles, and up to the present day this is done by pulling the stems from the ground by hand—an operation which is both strenuous and costly to perform.

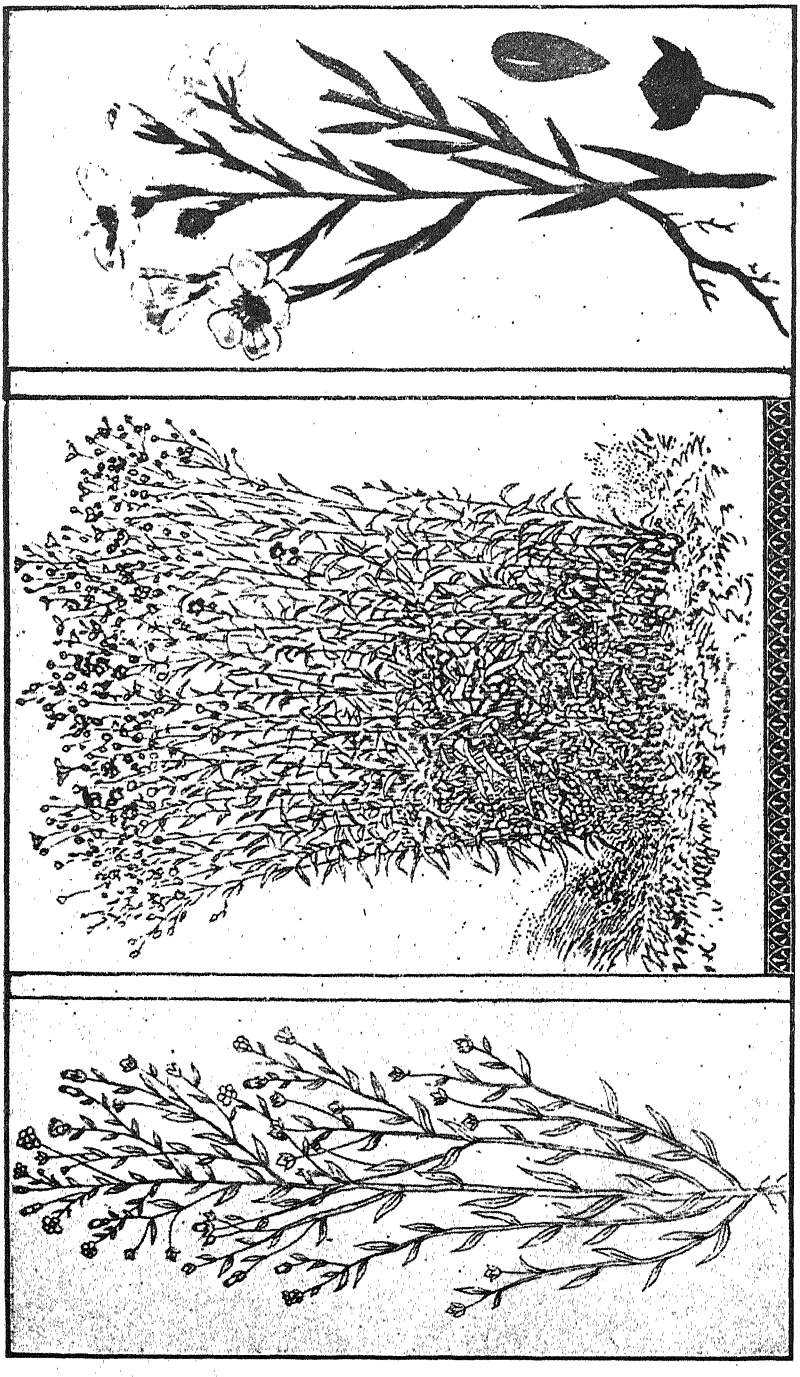


PLATE 12.—FLAX PLANT (LINUM USITATISSIMUM).

FIG. 1.—Flax Grown for Seed.

FIG. 2.—Flax for Fibre.

FIG. 3.—Flax Plant.

"After drying in the field for a few days, the seed is removed by some simple device which does not disarrange the long flax stems, and the straw is then ready for the operations necessary for separating the fibre from the straw. The valuable part of the straw—namely, the fibre—is situated almost on the outside of the stem, where it forms a series of irregular groups or bundles running longitudinally, which are held in position by a gummy or resinous material. Before the harvested straw can be utilised by the spinner in the customary way, these bundles of long fibres have to be isolated, and notwithstanding the large number of processes which have been devised for accomplishing this separation, the most satisfactory method is to allow the stems to damp-rot, a process which is known as *retting*.

## METHODS OF RETTING.

"From the earliest times to the present the process of retting has been conducted either by submerging the flax stems in water or by allowing alternate dew, sunshine, and rain to carry forward the decomposition of the gum so that the fibre may be readily detached from the woody part of the straw. These operations, known respectively as water-retting, or steeping, and dew-retting, are still the most usual and most satisfactory means to adopt, and, as carried out to-day in the principal flax-growing districts of Europe, present little departure from the methods adopted in medieval times.

" Dew-retting is the simplest of all methods of retting which have been devised, as it only necessitates spreading the straws thinly over the ground in regular rows, where they are allowed to remain for about six weeks, during which time they are occasionally turned over. As might be expected, the fibre resulting from this treatment is generally discoloured and low in quality; nevertheless, enormous quantities of dew-retted flax are annually prepared in Russia, Austria-Hungary, and other countries.

" The other method of retting referred to—namely, water-retting, as practised in Ireland, Russia, Silesia, France, and parts of Holland and Belgium—is still conducted on primitive lines. The bundles of straw are packed closely into pits containing water, a light covering of straw or leaves put on the top, and upon this a suitable weight of stones is arranged so as to keep the whole mass submerged during the retting period. During summer weather the usual time for steeping flax is from ten to twelve days, and when the adjudged point has been reached the straw is removed and either spread over grass land or opened out and stood upon end to dry.

" In certain districts a somewhat different practice obtains. For instance, in the south of Holland and East Flanders the bundles of flax are kept submerged in the water by covering the entire mass with mud, whilst in Friesland the bundles are merely floated upon the surface of the water and are frequently turned over. There can be no doubt that the best flax fibre comes from the neighbourhood of the River Lys, near Courtrai, where the practice is followed of twice submerging the straw in the river—a method known as double-retting or Lys-retting. For the production of high-class fibre this method stands before all others which up to the present have been tried. It is a practice which originated in the neighbourhood of Courtrai about the middle of last century, soon after it had been discovered that retting is primarily a fermentation process.

"The Belgian workers have undoubtedly acquired remarkable skill and judgment in retting and handling the wet stems, but it is probable that their singular success is to be attributed in some measure also to the character of the River Lys, to its sluggish movement, to the organic matter it carries from towns higher up its course, and to the fact that large quantities of flax are annually retted in its waters.

"Following the retting process, the flax straw is carefully dried, then passed between fluted rollers so as to break up the brittle woody part of the stems and leave the long, more elastic fibres uninjured. These are then freed from the loosely adhering broken pieces of stem by a beating process which is known as *scutching*, now performed by machinery so devised that the old-fashioned hand-beating with flat wooden blades is reproduced."

## RHODES GRASS AT YALLEROI.

We have received from Mrs. J. Adams another photograph of the remarkable crop of Rhodes Grass grown at Henley Park, and mentioned in the April issue of the Journal. The grass, we are informed, was

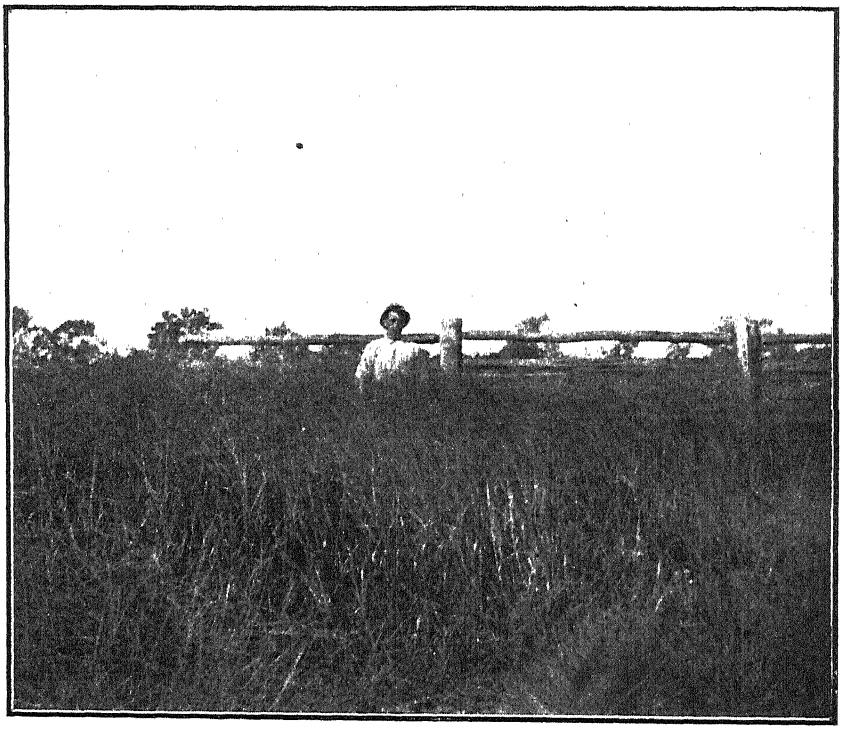


PLATE 13.—RHODES GRASS GROWING ON HENLEY PARK, 19TH MARCH, 1917; HEIGHT, FIVE FEET.

grown on unploughed land, the seed being scattered on the surface just before the spring showers. It is now 5 ft. high and spreading fast. It is grown in desert country.

# Pastoral.

## BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| P. Young .. .. | Talgai West, Ellinthorp | 2 | 42 | Milking Shorthorn Herd Book of Queensland |
| L. H. Paten .. .. | "Jeyendel," Calvert, S. & W. Line | 8 | 21 | Ayrshire Herd Book of Queensland |
| F. C. G. Gratton .. | "Towleston," Kingsthorpe | 2 | 14 | Holstein Cattle Club Herd Book |
| T. Mullen .. .. | "Norwood," Chelmer | 3 | 20 | Queensland Jersey Herd Book |
| J. H. Paten .. .. | Yandina .. .. | 6 | 21 | Ayrshire Herd Book of Queensland |
| Queensland Agricultural College | Gatton .. .. | 2 | 6 | Ayrshire Herd Book of Queensland |
| | | 2 | 3 | Holstein-Friesian Herd Book of Australia |
| | | 3 | 13 | Jersey Herd Book of Queensland |
| J W. Paten .. .. | Wanora, Ipswich .. | 10 | 42 | Ayrshire Herd Book of Queensland |
| M. W. Doyle .. .. | Moggill .. .. | 4 | 12 | Queensland Jersey Herd Book |
| G. A. Buss .. .. | Bundaberg .. .. | 1 | 15 | Herd Book of the Jersey Cattle Society of Queensland |
| W. Rudd .. .. | Christmas Creek, Beaudesert | 2 | 10 | Milking Shorthorn Herd Book of Queensland |
| M. F. and R. C. Ramsay | Talgai, Clifton .. | 5 | 27 | Herd Book of the Jersey Cattle Society of Queensland |
| George Newman .. | Wyreema .. .. | 9 | 37 | Holstein-Friesian Herd Book of Australia |
| R. Conochie .. .. | Brooklands, Tingoora | 9 | 21 | Queensland Jersey Herd Book |
| W. J. Barnes .. .. | Cedar Grove .. | 10 | 37 | Queensland Jersey Herd Book |
| T. B. Murray-Prior .. | Maroon, Boonah .. | 2 | 37 | Queensland Shorthorn and Australian Herd Books |
| W. J. Affleck .. .. | Grasmere, N. Pine .. | 6 | 31 | Queensland Jersey Herd Book |

# Poultry.

## FINAL REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, APRIL, 1916, TO MARCH, 1917.

The thirteenth egg-laying competition at the Queensland Agricultural College was brought to a close on 31st March, 1917. In all, 438 birds were subjected to the year's test, 318 in groups of six, while 120 were tested individually. Last year the single-hen test was introduced for the first time in the Gatton competition, and the results obtained fully justify the innovation. In truth, the group testing has to a great extent served its purpose. It merely indicated the general quality of the competitors' flocks, and while this is certainly of value in letting the general public know where poultry of quality can be obtained, it does not serve any considerable purpose in indicating the qualities of the individual hen. But rapid improvement in stock can only be secured by mating together the individual best, and it is because the single-hen test finds the best individual layers that it is so important. Analysing the results of the single test, it is very significant that the Dixie Egg Plant should have entered five splendid layers who averaged 279 eggs per bird, while the sixth hen proved to be quite barren. In other cases considerable variation in the egg-laying capacity of individual birds is shown, while for such breeders as Miss Hinze, T. Fanning, J. Zahl, J. M. Manson, A. T. Coomber, and J. H. Gill, the test has proved of exceptional value in indicating the uniformity of their stock. It is the desire of the College authorities to replace all the six-hen pens with single-hen pens, and it is hoped that the Government will recognise the importance and value of such a move. At present money may not be available for such a reconstruction, but it is anticipated that this work will be carried out at the first opportunity. In regard to this, it cannot be forgotten that both in New South Wales and Victoria they have recognised the necessity of single hen testing only, and have dispensed with their group pens. Further, primary industries are destined to play a most important part in the Empire's recovery after the war. In no way can that section of primary production, egg production, be assisted better than by promoting ample facilities for single hen testing, so that the general efficiency of the flocks may be improved.

### GENERAL DISCUSSION OF RESULTS.

Although in the past competition no records were broken, it is particularly interesting to note that four pens reach or exceed a total of 1,500 for six hens, while ten exceeded 1,400. On the other hand, a greater number than was expected fell below 1,200. As a result of the whole, the average per hen works out at 209·7 eggs. This is lower than any competition at the College for the past five years. In part, this can be explained by the fact that the number of competitors was increased

by 20 pens, and probably younger or less experienced breeders were admitted, but the main cause was the weather conditions. The heavy egg-producing months were characterised by excessive rains, as shown by the following table:—

| | Rainfall in Inches. | Number of Rainy Days. |
|---|---|---|
| 1916— | | |
| April | 4·83 | 10 |
| May | ·30 | 2 |
| June | 1·95 | 9 |
| July | 1·57 | 5 |
| August | 1·79 | 6 |
| September | 1·84 | 6 |
| October | 2·93 | 9 |
| November | 4·96 | 11 |
| December | 2·63 | 10 |
| 1917— | | |
| January | 4·81 | 14 |
| February | 4·01 | 8 |
| March | 2·97 | 10 |

In examining the general results below, it is significant to note that the five leading teams were tested in single pens, and that all of them were owned by Queensland breeders, thus indicating a very high and uniform standard of egg production in some of our yards.

## HEALTH OF THE STOCK.

During the year nineteen birds died—one from heat apoplexy, six from crop troubles following chicken pox, and twelve from ovarian disorders. During the year we had 471 cases of broodiness: one pen of six hens had 40 cases; others, 33, 28, 28, 23, 22, 22, 20, 18, 12, and down to 1 respectively.

## FINANCIAL ASPECT.

Although it is difficult to draw definite financial conclusions from an egg-laying competition such as this, still it is of very considerable interest to see how the cost of feed compares with the net returns for eggs. Naturally, the cost of labour cannot be entered; for in a competition labour and supervision are far in excess of what is required in a commercial enterprise. Further, the cost of rearing pullets to the laying stage cannot be included, but this item can be practically cancelled, inasmuch as the sale of cockerels as table birds should cover this expenditure. Referring to the financial statement below, and neglecting the entry fees received and prize money paid, we have the average return per bird as 18s. 8d., and the average cost per bird for feed only 6s. 2¾d., giving an average profit per bird of 12s. 5¼d. Obviously this profit is much larger for the top pens than for the lower. Also, the returns shown scarcely indicate the relative values of each pen, as those which laid heavily during the winter months, or at times when eggs were dear, returned a higher profit than those which laid heavily during the flush season. It is hoped to keep records during the coming competition as will give these details.

## A NOTE OF WARNING.

During the competition careful weighings of eggs were carried out, with the following results:—

### RESULTS OF WEIGHING EGGS FROM SIX HEN PENS.

| Competitors. | Breed. | Average Weight per Egg. | Competitors. | Breed. | Average Weight per Egg. |
|---|---|---|---|---|---|
| | | Oz. | | | Oz. |
| A. T. Coomber ... | S. Buttercups | 2·10 | H. Hammill ... | W. Leghorns | 2·00 |
| P. Brodie ... ... | W. Leghorns | 2·00 | W. Lindus ... | Do. ... | 2·00 |
| S. B. Tutin ... | Do. ... | 2·00 | Mars Poultry Farm | B. Orpingtons | 1·85 |
| J. Anderson ... | Do. ... | 2·15 | F. Clayton ... | W. Leghorns | 1·90 |
| T. Taylor ... ... | Do. ... | 1·95 | Moritz Bros. ... | Do. ... | 2·05 |
| G. Tomlinson ... | Do. ... | 1·90 | A. F. Camkin ... | Do. ... | 1·90 |
| E. F. Dennis ... | B. Orpingtons | 1·80 | W. Becker ... | Do. ... | 2·00 |
| F. Clayton ... | R. I. Reds ... | 1·95 | E. F. Dennis ... | W. Wyandottes | 1·60 |
| Mrs. C. Davis ... | W. Leghorns | 1·95 | | | |
| J. G. Richter ... | Do. ... | 1·90 | | | |
| G. H. Turner ... | Do. ... | 2·00 | Harveston Poultry Farm | W. Leghorns | 2·00 |
| E. Pocock ... ... | Do. ... | 1·95 | | | |
| H. Jobling ... | B. Orpingtons | 1·80 | W. Purvis ... | Do. ... | 1·95 |
| H. W. Board .. | W. Leghorns | 1·90 | W. Lyell ... | Do. ... | 1·95 |
| F. W. Leney ... | Do. ... | 2·05 | R. Burns ... | B. Orpingtons | 1·90 |
| W. Meneely ... | Do. ... | 1·90 | A. Howe ... | W. Leghorns | 1·95 |
| J. R. Wilson ... | Do. ... | 1·90 | L. K. Pettit ... | Do. ... | 2·00 |
| T. Fanning ... | B. Orpingtons | 1·80 | Mrs. Bradburne | Do. ... | 2·00 |
| Cowan Bros. ... | W. Leghorns | 2·10 | W. Hirst ... | Do. ... | 1 95 |
| A. H. Padman ... | Do. ... | 2·00 | R. Burns ... | S. L. Wyandottes | 2·00 |
| J. M. Manson ... | B Orpingtons | 1·70 | | | |
| Mrs. Munro ... | W. Leghorns | 2·00 | T. B. Hawkins... | W. Leghorns | 2·05 |
| Geo. Prince ... | Do. ... | 1·90 | Cowan Bros. ... | B. Orpingtons | 1·95 |
| W. H. Forsyth ... | B. Orpingtons | 1·95 | Dr. Jennings ... | W. Leghorns | 1·95 |
| King and Watson | W. Leghorns | 2·05 | T. E. Jarman ... | Do. ... | 2·15 |
| Mars Poultry Farm | Do. ... | 2·05 | J. Gosley ... | Do. ... | 1·90 |
| A. W. Bailey ... | Do. ... | 1·95 | Kelvin Poultry Farm | Do. ... | 1·85 |
| G. W. Holland ... | Do. ... | 1·95 | | | |
| F. W. Leney ... | R. I. Reds ... | 1·95 | C. P. Buchanan | Do. ... | 2·55 |

### SINGLE HEN TEST RESULTS. (Oz.)

| Competitors. | Breed. | A. | B. | C. | D. | E. | F. | Average. |
|---|---|---|---|---|---|---|---|---|
| J. Zahl ... ... ... | W. Leghorns | 2·15 | 2·15 | 2·00 | 2·05 | 2·00 | 1·90 | 2·04 |
| Dixie Egg Plant ... | Do. ... | 1·95 | 1·95 | 2·05 | 1·95 | ... | 2·05 | 1·99 |
| J. H. Madrers ... | R. I. Reds ... | 2·00 | 2·10 | 1·90 | 2·30 | 2·05 | 2·35 | 2·12 |
| A. E. Walters ... | W. Leghorns | 2·05 | 2·00 | 2·20 | 1·95 | 1·95 | 2·05 | 2·03 |
| W. H. Knowles ... | Do. ... | 2·05 | 1·90 | 2·05 | 2·00 | 1·85 | 2·15 | 2·00 |
| Mrs. Jobling ... | B. Orpingtons | 1·90 | 1·95 | 2·15 | 2·00 | 1·75 | 1·85 | 1·93 |
| C. Knoblauch ... | W. Leghorns | 2·10 | 1·95 | 2·05 | 1·90 | 1·90 | 1·95 | 1·98 |
| J. F. Dalrymple ... | R. I. Reds ... | 2·00 | 2·20 | 2·00 | 2·25 | 2·25 | 2·25 | 2·16 |
| J. M. Manson ... | W. Leghorns | 2·10 | 2·20 | 2·30 | 2·25 | 2·25 | 2·00 | 2·18 |
| Miss Hinze ... ... | Do. ... | 2·05 | 2·30 | 2·25 | 2·00 | 2·10 | 2·05 | 2·13 |
| E. F. Dennis ... | Do. .. | 2·15 | 2·10 | 2·35 | 1·90 | 2·10 | 2·25 | 2·14 |
| Kelvin Poultry Farm | Do. ... | 2·00 | 1·80 | 2·05 | 2·20 | 1·90 | 2·10 | 2·01 |
| E. A. Smith ... ... | Do. ... | 2·00 | 2·05 | 2·25 | 2·15 | 2·30 | 2·05 | 2·13 |
| J. W. Macrae ... | B. Orpingtons | 2·05 | 1·60 | 1·95 | 2 10 | 2 00 | 2·00 | 1·95 |
| T. Fanning ... ... | W. Leghorns | 2·05 | 2·10 | 2·05 | 2·05 | 2·00 | 1·95 | 2 05 |
| J. H. Gill ... ... | Do. ... | 2·05 | 1·90 | 2·10 | 1·95 | 1·80 | 2·00 | 1·97 |
| J. Anderson... ... | R. Sussex ... | 1·95 | 2·05 | 2·00 | 2·00 | 1·60 | 2·00 | 1·93 |
| A. T. Coomber ... | W. Leghorns | 2·05 | 2·10 | 1·95 | 1·95 | 2·20 | 2·05 | 2·05 |
| E. West ... ... | Do. ... | 2·00 | 2·25 | 2·20 | 2·00 | 2·00 | 2·40 | 2·14 |
| W. L. Forrest ... | Do. ... | 2·05 | 2·10 | 2·35 | 1·95 | 2·15 | 1·95 | 2·09 |

RESULTS OF SINGLE HEN TEST.

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| Miss Hinze ... ... ... | 266 | 223 | 289 | 241 | 270 | 253 | 1,542 |
| T. Fanning ... ... ... | 275 | 266 | 272 | 261 | 227 | 229 | 1,530 |
| J. Zahl ... ... ... ... | 258 | 270 | 216 | 262 | 259 | 251 | 1,516 |
| J. M. Manson ... ... ... | 224 | 276 | 239 | 242 | 276 | 243 | 1,500 |
| A. T. Coomber ... ... ... | 263 | 271 | 243 | 231 | 231 | 236 | 1,475 |
| E. A. Smith ... ... ... | 255 | 269 | 239 | 265 | 199 | 183 | 1,410 |
| J. H. Gill ... ... ... ... | 214 | 237 | 238 | 267 | 212 | 227 | 1,395 |
| W. H. Knowles, junr. ... ... | 201 | 233 | 238 | 202 | 261 | 245 | 1,380 |
| Dixie Egg Plant ... ... ... | 291 | 269 | 265 | 269 | ... | 260 | 1,354 |
| J. F. Dalrymple ... ... ... | 198 | 236 | 236 | 196 | 265 | 213 | 1,344 |
| A. E. Walters ... ... ... | 241 | 275 | 229 | 203 | 239 | 200 | 1,387 |
| E. F. Dennis ... ... ... | 200 | 237 | 184 | 265 | 233 | 200 | 1,319 |
| Mrs. Jobling ... ... ... | 211 | 276 | 197 | 202 | 194 | 208 | 1,288 |
| E. West ... ... ... ... | 234 | 235 | 206 | 205 | 189 | 201 | 1,270 |
| C. Knoblauch ... ... ... | 191 | 235 | 223 | 189 | 205 | 224 | 1,267 |
| W. L. Forrest ... ... ... | 240 | 237 | 62 | 185 | 255 | 234 | 1,213 |
| Kelvin Poultry Farm ... ... | 193 | 167 | 159 | 194 | 266 | 174 | 1,153 |
| J. H. Madrers ... ... ... | 150 | 223 | 224 | 215 | 165 | 176 | 1,153 |
| J. W. Macrae ... ... ... | 157 | 232 | 214 | 222 | 148 | 170 | 1,143 |
| J. Anderson ... ... ... | 202 | 166 | 232 | 114 | 196 | 167 | 1,077 |

In these weighings every care was taken to secure at least six eggs from each pen when the birds were in full lay. Because of possible errors, a 5 per cent. margin was allowed. Hence eggs ranging on the average from 1·90 oz. and upwards were allowed. It is significant that some of the breeds, notably the Black Orpingtons, were generally low. Excessive size of eggs is not required, but the standard of 24 oz. per dozen is in no way excessive, and breeders should aim at this. Another point to be noted is that many competitors sent their birds forward in full lay. This generally results in the birds getting a distinct setback owing to altered conditions. Another point to be noted is that, in the endeavour to breed a strictly utility type, the general good points of many of the breeds are being ruined. Perhaps in no case is this more evident than with Black Orpingtons. In order to prevent this the 1917-18 competition

has been divided into two sections, A and B; A for light breeds and B for heavy breeds. Also, special prizes are to be given for pens which have been declared true to type. Following this, and in imitation of the practice followed in New South Wales, it is our intention to institute certain weight conditions for the pullets of each breed in the 1918-19 competition. This warning is given because we want Queensland breeders to be prepared. Weight, size, and type are not foolish notions. They are indications of stamina, health, and breed which cannot long be neglected without disastrous results to the poultry industry.

## ALLOTMENT OF PRIZE MONEY.

| | £ s. d. | £ s. d. |
|---|---|---|
| Miss M. Hinze— | | |
| First, highest aggregate .. .. .. | 7 7 0 | |
| Second, single-hen test .. .. .. .. | 3 3 0 | |
| Monthly prize, September (½) .. .. | 0 5 0 | |
| | | 10 15 0 |
| T. Fanning— | | |
| First, winter test .. .. .. .. | 3 3 0 | |
| Second, highest aggregate .. .. .. | 4 4 0 | |
| Monthly prize, April .. .. .. .. | 0 10 0 | |
| | | 7 17 0 |
| Dixie Egg Plant—First, single-hen test .. .. .. | | 5 0 0 |
| J. Zahl— | | |
| Second, winter test .. .. .. .. | 2 2 0 | |
| Third, highest aggregate .. .. .. | 2 2 0 | |
| Monthly prizes, May, September (½) .. | 0 15 0 | |
| | | 4 19 0 |
| J. M. Manson— | | |
| Third, single-hen test (⅔) .. .. .. | 1 8 0 | |
| Monthly prizes, October, March .. .. | 1 0 0 | |
| | | 2 8 0 |
| Mrs. J. H. Jobling— | | |
| Third, winter test .. .. .. .. | 1 1 0 | |
| Third, single-hen test (⅓) .. .. .. | 0 14 0 | |
| Monthly prize, June .. .. .. .. | 0 10 0 | |
| | | 2 5 0 |
| Cowan Bros.—Monthly prizes, July and August .. .. | | 1 0 0 |
| J. R. Wilson—Monthly prizes, November and February .. .. .. .. .. .. | | 1 0 0 |
| C. Tomlinson—Monthly prize, January .. .. .. | | 0 10 0 |
| E. Pocock—Monthly Prize, December (½) .. .. | | 0 5 0 |
| F. Meneely—Monthly prize, December (½) .. .. | | 0 5 0 |
| Total prize money .. .. .. .. | | £36 9 0 |

| Competitors. | Breed. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Miss M. Hinze, Milton road, Milton ... ... | White Leghorns ... ... | 19 | 122 | 122 | 139 | 152 | 160 | 158 | 140 | 146 | 124 | 135 | 125 | 1,542 |
| *T. Fanning, Ashgrove, Brisbane ... ... | Do. ... ... | 104 | 124 | 101 | 141 | 133 | 149 | 157 | 122 | 131 | 115 | 140 | 113 | 1,530 |
| *J. Zahl, Boonah ... ... ... ... ... | Do. ... ... | 61 | 132 | 104 | 147 | 143 | 160 | 155 | 133 | 148 | 118 | 105 | 110 | 1,516 |
| *J. Manson, Milton road, Milton ... ... | Do. ... ... | 28 | 96 | 120 | 133 | 151 | 158 | 167 | 141 | 148 | 124 | 102 | 132 | 1,500 |
| *A. T. Coomber, Brown's Estate, Bundaberg ... | Do. ... ... | 64 | 122 | 90 | 126 | 146 | 157 | 159 | 132 | 146 | 128 | 117 | 88 | 1,475 |
| J. R. Wilson, Eudlo ... ... ... ... | Do. .. ... | 3 | 73 | 122 | 146 | 150 | 155 | 165 | 144 | 153 | 134 | 147 | 70 | 1,462 |
| Geo. Tomlinson, Boonah ... ... ... ... | Do. ... ... | 36 | 76 | 113 | 129 | 143 | 149 | 162 | 133 | 152 | 154 | 129 | 64 | 1,440 |
| G. H. Turner, Aratula ... ... ... ... | Do. ... .. | 53 | 88 | 113 | 135 | 146 | 151 | 159 | 137 | 142 | 126 | 120 | 68 | 1,438 |
| W. Meneely, Warwick ... ... ... ... | Do. ... ... | 30 | 100 | 122 | 119 | 145 | 148 | 159 | 137 | 157 | 143 | 124 | 34 | 1,418 |
| *E. A. Smith, Paddington, Brisbane ... ... | Do. ... ... | 48 | 73 | 93 | 123 | 141 | 149 | 155 | 132 | 146 | 139 | 123 | 88 | 1,410 |
| *J. H. Gill, Cheltenham, Victoria ... ... | Do. ... ... | 45 | 51 | 77 | 123 | 140 | 134 | 154 | 132 | 151 | 140 | 122 | 126 | 1,395 |
| *A. E. Walters, Bank street, South Brisbane ... | Do. ... ... | 56 | 67 | 93 | 118 | 145 | 148 | 160 | 128 | 141 | 138 | 120 | 23 | 1,387 |
| A. Howe, Wickham, N.S.W. ... ... ... | Do. ... ... | 64 | 90 | 123 | 134 | 149 | 152 | 152 | 111 | 134 | 105 | 103 | 69 | 1,386 |
| *W. H. Knowles, junr., Taringa ... ... ... | Do. ... ... | 26 | 45 | 69 | 130 | 141 | 152 | 154 | 137 | 144 | 137 | 141 | 104 | 1,380 |
| Mrs. J. R. D. Munro, Warwick ... ... ... | Do. ... ... | 44 | 86 | 101 | 86 | 137 | 154 | 158 | 130 | 142 | 136 | 115 | 83 | 1,372 |
| J. M. Manson, Milton ... ... ... ... | Black Orpingtons ... ... | 39 | 66 | 103 | 129 | 145 | 156 | 151 | 128 | 142 | 116 | 104 | 87 | 1,366 |
| Dr. E. C. Jennings, Ipswich ... ... ... | White Leghorns ... ... | 29 | 94 | 117 | 136 | 149 | 144 | 148 | 123 | 140 | 124 | 113 | 45 | 1,362 |
| *Dixie Egg Plant, Newmarket ... ... ... | Do. ... ... | 55 | 115 | 100 | 124 | 130 | 135 | 132 | 117 | 129 | 123 | 88 | 106 | 1,354 |
| *J. F. Dalrymple, Rochdale, N.S.W. ... ... | Rhode Island Reds ... ... | 24 | 83 | 102 | 117 | 150 | 154 | 136 | 111 | 127 | 124 | 112 | 104 | 1,344 |
| A. W. Bailey, Red Hill, Brisbane ... .. | White Leghorns ... ... | 33 | 71 | 110 | 113 | 130 | 145 | 150 | 126 | 144 | 136 | 120 | 64 | 1,342 |
| Geo. Prince, Grove Estate, Brisbane ... ... | Do. ... ... | 14 | 71 | 123 | 125 | 134 | 150 | 141 | 129 | 136 | 128 | 110 | 76 | 1,337 |
| *E. F. Dennis, Brisbane ... ... ... ... | Do. ... .. | 38 | 90 | 92 | 110 | 141 | 145 | 163 | 135 | 141 | 132 | 83 | 49 | 1,319 |
| A. H. Padman, Adelaide, S.A. .. ... ... | Do. ... ... | 65 | 52 | 66 | 100 | 133 | 146 | 135 | 127 | 154 | 152 | 118 | 66 | 1,314 |
| H. W. Broad, Corinda ... ... ... ... | Do. ... ... | 45 | 54 | 103 | 101 | 147 | 146 | 145 | 128 | 135 | 134 | 113 | 62 | 1,313 |
| Cowan Bros., Burwood, N.S.W. ... ... ... | Do. ... ... | 0 | 23 | 85 | 104 | 144 | 147 | 166 | 142 | 152 | 145 | 139 | 57 | 1,304 |
| Mrs. W. D. Bradburne, Kagarah, N.S.W. ... | Do. ... ... | 75 | 50 | 67 | 117 | 147 | 151 | 150 | 137 | 140 | 132 | 100 | 31 | 1,297 |
| R. Burns, Sladevale, Warwick ... ... ... | S. L. Wyandottes ... ... | 3 | 39 | 104 | 143 | 147 | 148 | 143 | 118 | 129 | 124 | 109 | 84 | 1,291 |
| *Mrs. J. H. Jobling, Plattsburg, N.S.W. ... | Black Orpingtons ... ... | 64 | 106 | 125 | 131 | 140 | 155 | 127 | 107 | 85 | 87 | 97 | 64 | 1,288 |
| E. Pocock, Windsor, Brisbane ... ... ... | White Leghorns ... ... | 42 | 20 | 75 | 119 | 129 | 155 | 152 | 136 | 157 | 143 | 103 | 55 | 1,286 |
| W. Purvis, Glanville Blocks, S.A. ... ... | Do. ... ... | 6 | 48 | 57 | 126 | 146 | 157 | 164 | 132 | 150 | 128 | 98 | 72 | 1,284 |
| F. Clayton, Blacktown, N.S.W. ... ... ... | Do. ... ... | 27 | 58 | 88 | 119 | 132 | 141 | 142 | 127 | 145 | 139 | 116 | 47 | 1,281 |
| E. F. Dennis, Brisbane .. ... ... ... | Black Orpingtons ... ... | 0 | 3 | 97 | 126 | 155 | 160 | 151 | 126 | 136 | 134 | 121 | 71 | 1,280 |
| T. Taylor, Thompson Estate, South Brisbane ... | White Leghorns ... ... | 55 | 41 | 98 | 116 | 140 | 146 | 151 | 139 | 133 | 127 | 101 | 28 | 1,275 |
| W. Lyell, Graceville ... ... ... ... | Do. ... ... | 49 | 86 | 92 | 111 | 134 | 147 | 145 | 122 | 126 | 133 | 84 | 45 | 1,274 |
| *E. West, Grove Estate, Brisbane ... ... | Do. ... ... | 25 | 59 | 100 | 111 | 126 | 148 | 154 | 123 | 128 | 116 | 107 | 73 | 1,270 |
| *C. Knoblauch, South Brisbane ... ... ... | Do. ... ... | 41 | 52 | 89 | 121 | 133 | 144 | 144 | 121 | 133 | 126 | 110 | 53 | 1,267 |
| T. E. Jarman, Eastwood, N.S.W. ... ... | Do. ... ... | 62 | 58 | 83 | 114 | 137 | 139 | 148 | 125 | 136 | 127 | 95 | 37 | 1,261 |
| T. Fanning, Ashgrove, Brisbane ... ... | Black Orpingtons ... ... | 13 | 49 | 74 | 121 | 128 | 134 | 154 | 130 | 147 | 130 | 113 | 65 | 1,258 |
| T. B. Hawkins, Redbank ... ... ... ... | White Leghorns ... .. | 77 | 81 | 82 | 119 | 137 | 141 | 141 | 112 | 119 | 112 | 103 | 37 | 1,261 |
| King and Watson, St. Mary's, N.S.W. ... | Do. ... ... | 40 | 37 | 71 | 109 | 141 | 143 | 149 | 126 | 130 | 130 | 119 | 61 | 1,256 |
| P. Brodie, Greenmount ... ... ... ... | Do. ... ... | 62 | 57 | 86 | 88 | 124 | 141 | 150 | 135 | 142 | 128 | 97 | 45 | 1,255 |

| Competitors. | Breed. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A. F. Camkin, Canley Vale, N.S.W. | White Leghorns | 16 | 61 | 101 | 130 | 133 | 134 | 139 | 119 | 130 | 137 | 96 | 55 | 1,251 |
| Cowan Bros., Burwood, N.S.W. | Black Orpingtons | 19 | 19 | 104 | 153 | 157 | 135 | 140 | 116 | 108 | 117 | 99 | 75 | 1,242 |
| G. W. Holland, Paddington, Brisbane | White Leghorns | 48 | 33 | 46 | 75 | 117 | 143 | 159 | 136 | 151 | 150 | 125 | 57 | 1,240 |
| H. Jobling, Cessnock, N.S.W. | Black Orpingtons | 54 | 49 | 101 | 108 | 137 | 138 | 137 | 117 | 125 | 115 | 104 | 47 | 1,232 |
| Mars Poultry Farm, Sunnybank | Do. | 3 | 0 | 65 | 114 | 148 | 151 | 146 | 131 | 140 | 128 | 125 | 74 | 1,225 |
| Kelvin Poultry Farm, Kelvin Grove | White Leghorns | 30 | 73 | 87 | 102 | 147 | 154 | 152 | 124 | 145 | 116 | 72 | 23 | 1,225 |
| Mars Poultry Farm, Sunnybank | Do. | 20 | 55 | 92 | 111 | 132 | 142 | 149 | 129 | 139 | 135 | 81 | 36 | 1,221 |
| J. Anderson, Mordialloc, Victoria | Do. | 34 | 23 | 66 | 128 | 132 | 145 | 153 | 131 | 144 | 138 | 77 | 44 | 1,215 |
| *W. L. Forrest, Marrickville, N.S.W. | Do. | 38 | 38 | 107 | 120 | 128 | 145 | 138 | 109 | 115 | 106 | 101 | 68 | 1,213 |
| W. Becker, Toowoomba | Do. | 22 | 29 | 55 | 105 | 146 | 149 | 159 | 125 | 136 | 135 | 99 | 43 | 1,203 |
| H. Hammill, Kogarah, N.S.W. | Do. | 25 | 0 | 20 | 85 | 127 | 143 | 151 | 129 | 144 | 143 | 139 | 96 | 1,202 |
| W. Hirst, Blacktown, N.S.W. | Do. | 30 | 29 | 74 | 108 | 142 | 139 | 147 | 116 | 136 | 126 | 105 | 34 | 1,186 |
| Mrs. C. Davis, Engelsburg | Do. | 30 | 50 | 98 | 119 | 128 | 139 | 138 | 127 | 133 | 113 | 78 | 21 | 1,174 |
| Moritz Bros., Kalangadoo, S.A. | Do. | 5 | 0 | 8 | 91 | 136 | 146 | 159 | 142 | 150 | 131 | 124 | 71 | 1,163 |
| J. G. Richter, Aratula | Do. | 6 | 22 | 78 | 112 | 141 | 137 | 149 | 127 | 138 | 121 | 101 | 27 | 1,159 |
| *Kelvin Poultry Farm, Brisbane | Do. | 51 | 91 | 65 | 94 | 126 | 140 | 144 | 121 | 121 | 90 | 64 | 46 | 1,153 |
| *J. H. Madrers, Kogarah, N.S.W. | Rhode Island Reds | 44 | 50 | 53 | 117 | 132 | 139 | 128 | 106 | 114 | 100 | 117 | 53 | 1,153 |
| *J. W. Macrae, Mareeba | Black Orpingtons | 0 | 33 | 74 | 124 | 144 | 151 | 134 | 95 | 122 | 100 | 98 | 68 | 1,143 |
| F. Clayton, Blacktown, N.S.W. | Rhode Island Reds | 30 | 19 | 66 | 116 | 132 | 146 | 137 | 120 | 127 | 109 | 89 | 50 | 1,141 |
| C. P. Buchanan, Brisbane | White Leghorns | 42 | 67 | 89 | 113 | 119 | 140 | 133 | 98 | 117 | 105 | 70 | 45 | 1,138 |
| Harveston Poultry Farm, Rockhampton | Do. | 18 | 0 | 30 | 109 | 133 | 142 | 143 | 121 | 135 | 129 | 102 | 53 | 1,115 |
| R. Burns, Sladevale, Warwick | Black Orpingtons | 10 | 29 | 70 | 139 | 132 | 142 | 134 | 108 | 113 | 119 | 85 | 34 | 1,115 |
| S. B. Tutin, Kalkie, Bundaberg | White Leghorns | 66 | 74 | 88 | 107 | 134 | 144 | 121 | 89 | 94 | 92 | 67 | 14 | 1,090 |
| J. Gosley, Childers | Do. | 22 | 64 | 71 | 128 | 122 | 128 | 114 | 97 | 108 | 97 | 74 | 62 | 1,087 |
| W. Lindus, Cessnock, N.S.W. | Do. | 34 | 0 | 17 | 95 | 115 | 130 | 149 | 128 | 144 | 124 | 95 | 54 | 1,085 |
| *J. Anderson, Mordialloc, Victoria | Red Sussex | 86 | 71 | 53 | 93 | 119 | 112 | 121 | 88 | 101 | 80 | 96 | 57 | 1,077 |
| F. W. Leney, Warwick | White Leghorns | 23 | 2 | 32 | 84 | 136 | 141 | 147 | 130 | 124 | 118 | 89 | 37 | 1,063 |
| A. T. Coomber, Bundaberg | Sicily Buttercups | 20 | 47 | 31 | 43 | 112 | 134 | 135 | 112 | 120 | 107 | 124 | 74 | 1,059 |
| L. K. Pettit, Eastwood, N.S.W. | White Leghorns | 11 | 14 | 65 | 96 | 114 | 136 | 131 | 107 | 119 | 113 | 89 | 44 | 1,039 |
| W. H. Forsyth, Willoughby, N.S.W. | Black Orpingtons | 28 | 21 | 18 | 119 | 117 | 116 | 122 | 103 | 91 | 84 | 69 | 51 | 999 |
| E. F. Dennis, Kelvin Grove, Brisbane | White Wyandottes | 0 | 0 | 35 | 71 | 104 | 132 | 124 | 95 | 94 | 115 | 101 | 77 | 948 |
| F. W. Leney, Warwick | Rhode Island Reds | 19 | 20 | 0 | 53 | 131 | 138 | 135 | 110 | 113 | 110 | 67 | 19 | 915 |
| | Totals | 2,548 | 3,991 | 5,971 | 8,341 | 9,934 | 10,545 | 10,674 | 8,977 | 9,708 | 8,994 | 7,638 | 4,540 | 91,861 |

* Indicates that the pen is engaged in the single-hen test.

## BALANCE-SHEET.

| EXPENDITURE. | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Prize money | | | | 36 | 9 | 0 |
| Feed— | | | | | | |
| Wheat, 327 bushels | 79 | 14 | 6 | | | |
| Maize, 18 bushels | 3 | 19 | 8 | | | |
| Pollard, 391 bushels | 25 | 18 | 8 | | | |
| Bran, 190 bushels | 11 | 15 | 2 | | | |
| Oilcake, 5 cwt. | 3 | 6 | 9 | | | |
| Desiccated meat, 4 cwt. | 3 | 8 | 6 | | | |
| Bonemeal, 4 cwt. | 3 | 16 | 0 | | | |
| Green lucerne, value | 2 | 0 | 0 | | | |
| Soup meat, value | 3 | 0 | 0 | | | |
| | | | | 136 | 19 | 3 |
| Balance | | | | 296 | 13 | 7 |
| Total | | | | £470 | 1 | 10 |

| RECEIPTS. | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Entry fees (9 withdrawals) | | | | 61 | 0 | 0 |
| Sales of eggs— | | | | | | |
| Orient S.S. Co., 490 dozen | 26 | 3 | 10 | | | |
| Barnes and Co. (net), 3,983 dozen | 190 | 1 | 10 | | | |
| Defence Department, 880¾ dozen | 48 | 8 | 2 | | | |
| Dining hall, 2,342⅓ dozen | 144 | 8 | 0 | | | |
| | | | | 409 | 1 | 10 |
| Total | | | | £470 | 1 | 10 |

## BANANA BEETLE TRAP.

Mr. A. H. Benson, Director of Fruit Culture, paid a visit lately to Redland Bay to investigate the Banana Beetle Borer trouble, and to discuss with the fruitgrowers of the district some method of combating the pest. The extent of damage done to the banana groves may be estimated by the statement of one grower that during the previous three weeks he had trapped 4,380 beetles. Mr. Benson, on inspecting the traps, found 200 beetles in one of them. The trap consists merely of a banana bulb cut in half. The cut surface lies on the ground and the beetles are attracted to it from the plants in numbers, when they are easily destroyed. The traps or, rather, the cut surface of the half-bulb, if freshened now and then, will last for a considerable time. The beetles appear to prefer the cut bulb to the plant itself, as was shown by the fact that when the trap was placed beside young growing plants, the latter were not touched, although numerous beetles were around the trap. At the meeting of fruitgrowers, a motion was made to the effect that the trapping be made compulsory wherever the beetles exist, and it was carried by 35 votes to 6. Mr. Benson stated that the idea that the fruit was affected by the beetles' work was erroneous, because unless the beetle actually destroys the plant on which the bunch is growing, there is no sign of deterioration of the fruit.

# Viticulture.

## DRYING GRAPES.

A very instructive paper on Fruit Drying, by Mr. J. Allen, appeared in the January issue of the "Agricultural Gazette" of New South Wales. From it we extract the chapter on Drying Grapes, which will prove of much interest to vignerons in Queensland.

"Grapes of all classes," writes Mr. Allen, "are usually dried in the open air rather than in the evaporator. The former gives a more uniform and better sample, while the latter process is both slow and costly. In wet seasons, however, the evaporator may be requisitioned even for grapes, though, by using covered racks, this difficulty may be largely overcome. There are times, chiefly late in the season, when owing to damp nights and cold days, it is impossible to finish the drying properly in the open air, and it is then that even the grapegrower will find the evaporator almost an essential.

"Of recent years, drying racks have to a large extent superseded trays for drying currants, sultanas, and even lexias. They are more economical and turn out a superior article to that dried on trays in the sun. In the case of currants, however, the method that eclipses all others as far as the quality of the product is concerned, is to stack the trays containing the fruit on top of one another, and by this means to allow the fruit to dry slowly without direct exposure to the sun. The drawback to this method is that the cost is considerably increased by reason of the large number of trays required.

### "TABLE RAISINS.

"It will be found that the best raisin grapes are grown on the lighter and richer soils, and I have never yet in Australia seen a first-class raisin made from grapes grown on a stiff soil.

"To make a good table raisin, the grapes must be grown to perfection—that is, the grape when ripe should be large, thin-skinned, fleshy, and containing plenty of sugar, and the bunches must be well filled. The larger the berries and clusters, the better the appearance of the dried article will be.

"Picking grapes for either pudding or table raisins should be delayed until the fruit is perfectly ripe. For the latter purpose especially, an unripe grape is most unsuitable. When exposed to the sun they will turn red, will take longer to dry than ripe grapes, and the finished product will be sour and of inferior quality. My experience with regard to picking is that in nine cases out of ten the inexperienced grower imagines that as soon as the grapes are sweet enough for eating they are ready to pick for raisin making, and, contrary to all advice, he will start picking only to find at the end of the first week that the grapes are not turning a good colour.

"The grapes which have so far produced a good commercial raisin in Australia are Gordo Blanco, Muscat of Alexandria and Waltham Cross (sometimes known as Eleme). I have had samples of raisins sent to me made from other kinds of grapes, which presented a fair appearance, but if the grower placed these on the market to compete with the raisins made from the above-mentioned varieties, he would find that they would not sell, so long as the latter were obtainable.

"The process of curing the table raisin is as follows:—Pick the very best clusters—that is, only such as are well filled with large, fine grapes—cut out all damaged or hard grapes, and lay the bunches carefully on trays, which should be then placed in the sun. By the end of the first week one side should be fairly well dried, and the bunches should be turned. This may be done by placing an empty tray on top of the full one. Two men can then take hold of the sides and invert the two, thus exposing to the sun the side of the fruit which has been lying next to the tray. After this turning it usually requires about another week to finish the drying process, if the weather is favourable. If the weather is damp or cool, it will, of course, take longer, and it is better to stack up the trays at night, covering the stacks with empty trays. If a table raisin gets wet during the curing process, the stem gets dark and the bloom spoiled, and the grade is lowered and the value of the fruit depreciated.

"Table raisins require to be dried slowly, and it is doubtful whether the evaporator will ever prove satisfactory for curing them. Even when dried in the sun, a higher temperature than 96 degrees will cause them to burn and will spoil the sample. At the very most, they should not be exposed to a higher temperature than 110 degrees in the evaporator, and it is probable that green fruit would be damaged by even that degree of heat. Consequently the cultivation of raisin grapes cannot be recommended in districts where the evaporator would have to be resorted to for curing them.

"PUDDING RAISINS OR LEXIAS.

"Grapes intended for this purpose should also be picked when fully ripe. All partially ripe and dried fruit should be removed, and the grapes then immersed for about three seconds in a lye made in the proportion of 1 lb. of Greenbank's caustic soda to 20 gallons of water. To turn out a raisin of good quality and appearance, the dipping solution should be kept at almost boiling point; if allowed to cool much below this, the fruit, instead of being a nice golden colour, will be brown.

"Other factors than the heat of the dipping solution may cause raisins to turn brown. For instance, it is impossible to make a good bright lexia, or a good quality of raisin of any sort, from grapes grown on some of the heavier or stiffer soils.

"It is a good plan to dip the fruit in the morning, or early afternoon, in order that it may have time to dry off before evening. Drying usually occupies from five to eight days, according to the weather. If dried on trays, it will be necessary on about the fourth day after dipping to turn the fruit, and care will have to be exercised to see that it does

not become too dry before it is taken in. A nice pliable fruit is always the best. Should there be any uncertainty as to whether the fruit is sufficiently dry or not, it can be tested by squeezing a few of the raisins between the thumb and finger; if no moisture exudes, then the fruit is quite dry enough. Lexias should be stemmed and graded as soon as possible after they are sufficiently dry to be removed from the tray to the sweat-box. If allowed to stand any length of time the stem becomes toughened and difficult to separate from the raisin.

"SULTANAS.

"For drying purposes sultanas should not be picked until fully ripe. A very common error, and one that greatly lowers the quality and the value of the dried product, is to pick the fruit too soon. Grapes that are apparently quite ripe and ready to pick for eating purposes should usually be left for at least another fortnight if they are to be dried. When they are of a clear amber colour, and perfectly sweet, without a trace of acidity in any of the berries, they should be about ready to pick. The last fortnight, before the fruit has attained this stage, adds considerably to the sugar content, and as this means increased weight and a better quality product, it is best not to pick until the fruit is dead ripe. As soon as possible after picking, the fruit should be dipped in a caustic solution.

"For sultanas, this should be made at a strength of 1 lb. of Greenbank's caustic soda to from 15 to 20 gallons of water—the exact quantity of water depending upon the toughness of the skin.

"The fruit should be dipped while the lye is almost at boiling point, but should not be immersed for longer than two seconds, or long enough to slightly crack the skin. The grapes should then be spread out thinly on drying racks, or on ordinary drying trays, and exposed to the sun. When trays are used, the fruit should always be turned the day after dipping. If the nights are cool, or rain threatens, the trays should be stacked up, and the stacks covered with empty trays, so that the fruit cannot be damaged. If the weather is very hot, the trays may be stacked up and allowed to remain thus until the sultanas are dry. Drying racks, where used, are usually provided with side curtains, which may be drawn to shelter the fruit from the direct rays of the sun.

"Under no circumstances should sultanas be exposed to too great a heat, as this will spoil the colour of the dried article and lower its value on the market.

"To realise the best prices, it is essential to produce a dried fruit of bright colour and high quality, and this may only be done by picking the fruit when dead ripe, dipping it carefully, and allowing it to dry slowly.

"ZANTE CURRANTS.

"The Zante currant is very easily cured. In this case also, the fruit should be allowed to hang until it is well coloured, and thoroughly ripe —that is until some of the currants on the bunches have begun to shrivel.

It may then be picked and placed on drying racks or trays as the case may be. Four or five days' exposure to the sun will usually dry the fruit so that it may be bagged, but should the temperature exceed 90 degrees in the shade, the trays should be stacked until the weather is cooler. In the case of drying racks, the curtains should be drawn to shade the fruit from the direct rays of the sun. As this fruit is liable to become moth-infested if exposed too long, it is advisable to bag it immediately it is sufficiently dry, and it is wise to leave it in these bags until it is stemmed and properly packed."

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## VITICULTURE AND THE WINE INDUSTRY AFTER THE WAR.

BY G. A. GATTINO.

A reputable enologist, writing from the French trenches, expressed these two sentences:—

"(1) The victory of the allied Italians, French, English, and Russians is an absolute necessity to viticulture.

"(2) The victory of the aforesaid Allies cannot be doubted by anybody."

His letter brought to me a lot of reflections and considerations, and gave me the subject for writing this article, addressing same to all viticulturists of Australia in general, and Queensland in particular.

I do not think it is too early for speaking of what will happen after the war, but on the contrary, I believe that it is indispensable that the viticulturists and wine merchants study now the problems which will crop up, so as to prepare for the best and most advantageous solutions possible.

Producers and merchants must become organised for the purpose of surmounting the post-war difficulties.

As you know, the future of all industries depends on the contents of the future treaty of peace, and, therefore, only by organisation will the wine growers and merchants be able to warn the competent authorities, that the latter may not neglect their interests at the opportune moment.

Now, we will just see what is likely to happen at the end of the war. Certainly it cannot be admitted that things will revert in the *status quo ante*. The crises are too radical and the changes will be very marked.

As far as viticulture is concerned, I foresee, after the war, an important extension of grape plantations and a sensible increase in the consumption of wine.

An increase in the consumption of wine is a very certain thing, and using the phrase adopted by the abovementioned enologist, I could say that wine will come out from the war absolutely triumphant. Wine is to-day a real necessity to all fighters, who implicitly, and without any exact consideration, are recognising and proclaiming its high moral and energetic virtues.

Anybody who approaches soldiers coming back from the French, Italian, or Balkan war zones will hear them speaking of wine in enthusiastic and affectionate terms.

Wine raises the morale of the fighters, dissipates their sad thoughts, and comforts the soul. Wine is necessary to recoup their enormous loss of energy when the nervous system is under such tension that it can only be imagined by those in the firing line. That is the reason why there are no teetotal soldiers in the trenches. [There is a very large number of abstainers in the trenches.—Ed., "Q.A.J."] That is the reason why that enologist says also that the war will be for wine a most gigantic advertisement.

You must admit, therefore, that all these brave soldiers returning home cannot forget their wine, and in accordance with their means, they will often substitute wine for their tea.

The Italians, French, and Spaniards drink wine plentifully, and it is indisputable that drunkenness in those nations has the lowest percentage in Europe.

Besides the increased consumption of wine in the aforesaid countries, other facts will confirm the opinion that the increase in the consumption will be general.

The great English armies which are fighting in France, the Belgian army, and the Russian troops gone to France and Macedonia, have all learned to drink wine daily, as a rule, and it is also proved that many of the traditional drinkers of tea, cider, or whisky, deplore having to go back to their national drink when wine is not available.

The conversion of the Anglo-Saxons to the cult of Bacchus will not be one of the smallest results of the great European war.

Several Governments have taken advantage of war conditions to pass prohibitive provisions against spirits. This action was really necessary, but, owing to political weakness, it could not be submitted until now. That which all the wine associations of the old country have declared and repeated: "Wine chases out alcohol," has at last been demonstrated.

From a circular dated 28th March ulto., from Caldwell's Wines Company, Limited, Sydney, one can already see the beginning of that consequence. The said Australian wine growers write as follows:—"Owing to the enormous increase in the prices of whiskies and brandies, Australian wines are in greater demand than ever before."

For the same reason wine is meeting with such favourable preference by the soldiers.

The sale to them of any alcohol or other beverage of high alcoholic title is strictly prohibited.

What will also bring about an increase in wine consumption is the higher wages to the workers, who will thus be able to afford to introduce wine in their families. I conclude by saying that the future of viticulture looks full of the best hopes, but it will depend on the terms and stipulations fixed by the peace and commercial treaties, and by the

conventions constituting the base of the future relations between the nations. The questions relating to the admission of wine in this country, in the British Empire, in the Allies', neutral, and enemy's countries, will be carefully regulated.

Agriculture in general is one of the most important branches of our national economy, and therefore, if the wine growers and merchants would organise, they could formulate and present in time to the Government the indispensable measures for the encouragement and amendments of the tariff as are wanted for the protection of our national trade and the development of the Australian production in the wine industry. By organising the wine industry we would obtain from the Government such internal laws and Acts as a means of encouraging the increase in the plantations of grapes, and the increase in the consumption of wine.

The Government could attain this end by encouraging the formation of co-operative wine cellars as per my articles which appeared in the September, October, and November, 1916, issues of the *Queensland Agricultural Journal,* by instituting experimental grape farms with annexed cellar, distillery and enological college; subsidising new plantations and facilitating the supply of vine cuttings; issuing money and medal prizes for the best up-to-date farm or cellar; for the best production of grapes or wine; for the best and lightest table wine produced. This would induce the growers to experiment in new methods of plantation, cultivation, and pruning, and would cause the winemaker to apply the most appropriate system and process of manipulation, fermenting, &c.,* increasing the duty on imported wines and spirits; regulating the use of the alcoholisation (fortifying) of the wines; maintaining a high price for alcohol by making its sale a State monopoly, which has been in vigorous existence in Italy for a number of years, and with great profit to the State and appreciable advantage to public health; facilitating the granting of wine licenses to the growers, the export of wines, &c.

* Will the wine growers of Roma or other localities awaken and give a start with the formation of co-operative wine cellars as per the articles on the subject which appeared in the issues of this Journal for September, October, and November, 1916. If only a few growers would decide on the formation of such an Association, I would draw up for them the "Articles of Association of the Co-operative," and give them my advisory assistance for the technical and business management of the new company. The Government would also encourage its formation by paying a subsidy loan of £1 for each £1 of capital possessed by the company. I am certain also, that besides encouraging the increase in the numbers of grape plantations, the formation of these co-operative wine cellars will necessarily induce the Government to also institute experimental grape farms, and formulate such measures, acts, and amendments of the tariff as they are wanted for the development and protection of a great industry. The Co-operative Wine Cellars would give birth to a form of commercial organisation which appears to be really necessary for the small and medium producer. Even if not immediately producing great quantities of wine, the Co-operative Cellars will attain the constitution of determined, constant types of wines in the localities where the cellars are operating, and by establishing a reputation for good, natural, and well-made wines, we would realise a consequent increase in the daily consumption of same, to the benefit of the public health and wealth.

In such a great State as Queensland, where immense areas of hilly, stony land of dry, calcareous loam soil are not utilised and unadapted for the extensive cultivation of other crops, this great agricultural wine industry would bring in its train new life, new prosperity, and a new source of wealth. With the protection of the Government, the returned soldiers also would find greater attraction and more glorious promise in the future of a vineyard than in anything else.

Once wine becomes a popular beverage you would see that anyone in this country having some available ground at his residence would grow his own grapes, for the use of his family at least, and none will be too poor to enjoy the purest and most wholesome of all stimulants—good, cheap, native wine.

As I previously stated, drunkenness also would be minimised, and the abstinence societies would have no more reason for existence. It is therefore indispensable that harmony should reign amongst all sons of this country, and wine growers and the wine merchants, who have more common interest than is actually believed.

The war taught us all that individual interest is a very small thing compared with general interest. We must not forget that the prosperity of the individual is strongly bound to that of collectivity. With the protection of the State and Federal authorities, beneath the glorious flag, with a strong commercial organisation, with the intelligent initiative of the individual, it can be foreseen with certainty that viticulture will have, after the war, a future full of prosperity.

The man on the land should give a good start, and I will give all my modest assistance for the success of this great wine industry. Let us take this glorious task in hand; let us work with all our heart and energy, for truly the object is worthy of our best endeavours.

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The "Journal of Agriculture of Victoria" for 10th January, 1916, contains a very valuable and instructive paper by the Government Viticulturist of that State, Mr. F. de Castella, which we republish in the interest of Queensland vignerons. The paper is entitled—

## THE SUMMER BUD OR "YEMA" GRAFT OF THE VINE.

Mr. Castella writes as follows on the subject:—

To plant a vineyard liable to destruction by phylloxera would be, to say the least, illogical, even in districts into which the insect has not yet found its way. It is already firmly established in several widely separated portions of the State, and the time will inevitably come when the whole of Victoria will be infested. In already phylloxerated areas, the resistant stock is, of course, indispensable, and the plantation of vines with vulnerable roots is quite out of the question.

A vineyard on resistant stocks may be established in two ways:—

1. Plantation of already grafted vines raised in a nursery, or, as they are usually called, "bench grafts."

2. Field grafting—in other words, the plantation of the vineyard with ungrafted resistant vines or stocks, which will subsequently be grafted to the European or "Vinifera" variety, from which it is desired to obtain fruit.

Field grafting, though the older method, has been gradually and very generally superseded in France by the planting of nursery-raised bench grafts, which renders possible the immediate establishment of an absolutely homogeneous vineyard, since it permits the weeding out, when lifting from the nursery, of all faulty grafts; only those being planted in which the union between stock and scion is flawless, thus insuring absolute evenness of the plantation, or what is called in California, "a good stand."

The chief objection to field grafting, especially in the colder climate of Northern Europe, is that a completely even stand can rarely be relied upon. Unless the spring be exceptionally favourable for the operation of grafting, gaps occur where vines have failed, as well as a certain proportion of faulty grafts which scarcely ever develop into thrifty vines. In our warmer Australian climate, weather conditions in spring are more favourable for grafting, and except in such an unusual season as the present one, results are generally far more satisfactory. Our climate is more similar to that of Spain and Portugal, where field grafting is held in higher esteem than in France. Nevertheless, even with us, anything which can insure a higher percentage of perfect unions will be a distinct boon to those reconstituting by means of field grafting, and the graft about to be described undoubtedly contributes to this result, both by the perfection of the union, and by the second chance it provides, of re-grafting the following spring, any of the summer grafts which have failed, or which are unsatisfactory.

## THE YEMA GRAFT IN SPAIN.

"Yema" means, in Spanish, a bud or eye—the germ of anything in fact, since it also signifies the yolk of an egg. It is the name generally given to this graft in southern Spain. Though often referred to as "budding" in northern Victoria, the operation is distinct from budding in the usual sense of the term, and as currently practised on citrus, roses, &c. It is real graft—a summer bud graft—for the wood of the vine is rather deeply cut into, and the woody core of the scion-bud is not removed as is usual in ordinary budding. The main differences to be found between it and ordinary grafting are the season when it is carried out, and the very small dimensions to which the scion is reduced. Like ordinary grafting, it is performed on the portion of the stock beneath the surface of the soil.* Budding is practised above ground, and usually on green herbaceous canes.

It was at Jerez de la Frontera, in Southern Spain, the home of sherry, that the writer first made the acquaintance of this graft which, since its introduction into Victoria, has been so successful that it bids

* Though the graft is made two or three inches above the surface level it is invariably covered by a protecting mound of earth, so that, during the knitting period, it is several inches below the surface of the mound. (See Fig. 3.)

fair to become the favourite field grafting method. On his return to Victoria, the Spanish graft was described in the "Journal of Agriculture of Victoria," in the issue of June, 1908. This description is here reproduced. It will be followed by some further details in the light of practical experience gained since its introduction into Victoria.

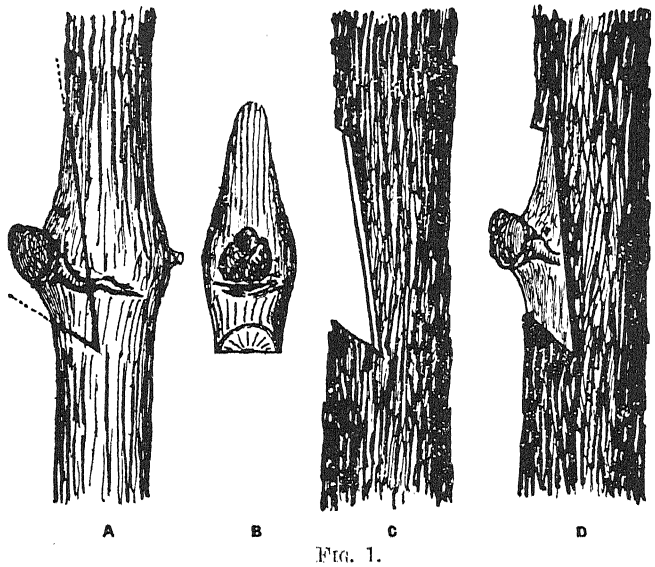



FIG. 1.

A and B.—Removal of bud for *Yema* graft.
C.—Stock ready to receive bud of *Yema* graft.
D.—*Yema* graft completed and ready for binding with raffia.

The other method is known as *Yema*. It is a summer bud graft and was quite new to me both as regards method and season for execution. It is a true graft, and not a form of budding in the sense in which we usually understand it, for the bud is removed together with a fair sized fragment of the already woody shoot of the current year's growth. The stock is prepared to receive it by the removal of a similar shaped piece of wood by means of four cuts of the grafting knife; into the gap thus made, which reaches nearly to the centre of the cane,* the properly cut eye is carefully fitted and securely bound with raffia. Care must be taken in fitting the bud into its place that the cambium layers of stock and scion correspond as accurately as possible. When tying, the raffia must first be placed over the bud and bound round and below it so as to insure thorough contact at the base of the graft.

This graft is best suited for cases where there is but slight difference in diameter between stock and scion, as in the case when a one or two year old rooted vine is grafted in the vineyard. *The upper part of the stock is not cut off but continues its growth,* the flow of sap which is thus maintained enables the union to take place under most favourable conditions. The graft knits, but *the bud remains dormant* until the following spring, when, after the upper part of the stock has been cut back, it makes very vigorous growth.

* According to later experience this would be too deep, as will be seen later.

August is the best month for the execution of this graft in Spain. This corresponds to February in Victoria; a convenient time, falling, as it does, between harvest and vintage. As soon as the young shoots of the current year are sufficiently lignified to provide a properly ripened but the operation may be performed. The bud is grafted on at about the level of the ground which is then heaped up around it into a high mound to protect it from changes of temperature and desiccation. (See Fig. 3.)

This graft practically gives the vigneron "two strings to his bow." When the time for ordinary spring grafting comes round it is possible to see if the bud has taken or if it is dead; in the latter case the stock is cut off half an inch below the bud graft which has failed and re-grafted in the ordinary way.

The unions obtained by means of this graft in southern Spain are really magnificient. . . . At the well-known Tula vineyard of

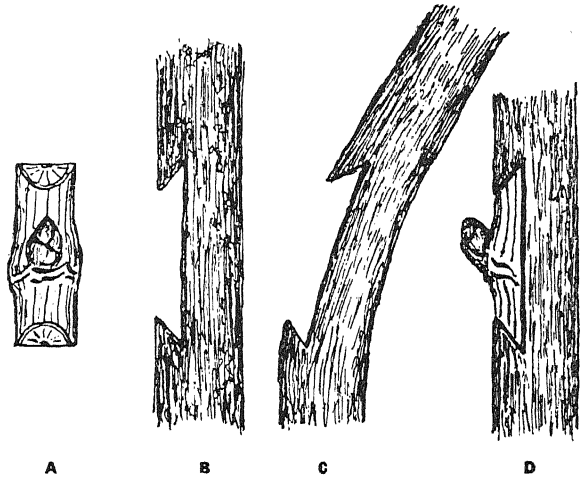



Fig. 2.—The Spanish *Yema* graft—second style.
A, the scion bud; B, incision in stock; C, same, bent to facilitate insertion of scion; D, graft completed and ready for tying.

Messrs. Gonzalez, Byass, and Coy., this style of grafting is in great favour. "*Espiga ne vale nada*" (The *espiga** graft is no good) said the *Capataz* (overseer) of Tula to me. He assured me that with the *Yema* a larger percentage succeeded and that the unions were more perfect. I have collected full information concerning this interesting graft and feel sure that it is at least worth a careful trial in the warmer parts of Victoria where climatic conditions are so similar to those of Andalusia, and where the perfect union it gives will no doubt render it popular.

In Spain, the graft is performed in two distinct ways. In addition to that illustrated in Fig. 1, it is sometimes executed as shown in Fig. 2. As will be seen, the fragment of cane which constitutes the scion is of practically the same thickness throughout. The socket or incision into

* Espiga is the Spanish name for the ordinary cleft graft.

which it will be fitted on the stock is also of different shape, being cut at the same angle above and below. It might be called a dovetail graft. When fitting the scion, the stock can conveniently be bent, as shown at C, Fig. 2, thus slightly elongating the socket, and facilitating the insertion of the scion, which is firmly held in place on the stock being allowed to straighten out again. A very neat graft can thus be executed, provided the scion has been judiciously chosen as to size, and it, as well as the stock, accurately and cleanly cut. It is, perhaps, a little more difficult than the first method, for which reason it was not described in the report quoted from above.

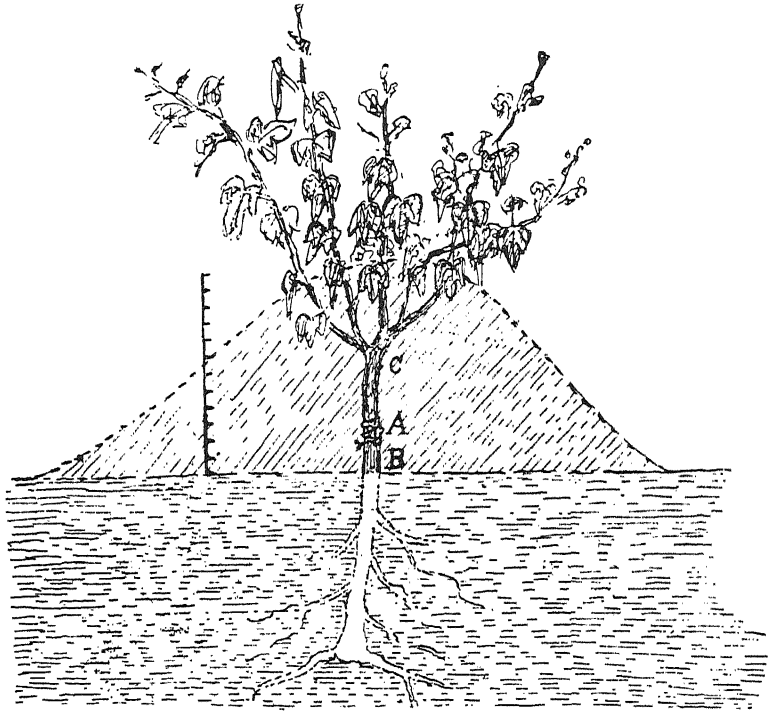



Fig. 3.—Young resistant vine in February, six months after plantation as an "engrafted rootling." The *Yema* graft has just been inserted at A, and protected by a mound of loose soil about 12 in. high—scale of inches to the left.

A general idea of the graft may be formed from Fig. 3, which shows a young resistant vine, planted as an ungrafted rootling in, say, August, 1915; the scion bud having been grafted in at "A" in February, 1916. As will be seen, immediately after grafting, the whole stem of the vine is mounded up with loose soil; the height of the mound is usually about 1 foot, the base of the young canes, and a good many leaves, being often covered with soil. It will be noted that the top of the stock is not cut off at the time of grafting,* but is allowed to continue its growth. This is, no doubt, one of the factors contributing to

* According to M. Maïs, severe topping is recommended immediately after grafting (see page 46). That is not usually done in Victoria. If the vine has not made very strong growth, it is probably better not to top, though in the case of very vigorous vines it might be an improvement; it would, at any rate, reduce the power of the wind, which, on a very strong vine, tends to break down the mound.

the excellence of the unions; the sap circulating freely in the tissues immediately adjacent to the graft, callusing is very thorough and complete.

Towards the end of winter the mound should be removed; it is, in fact, usually broken down before this by the ordinary cultural operations. It is then possible to see if the graft has succeeded, in which case the bud will be found to be large and healthy, and firmly united to the stock by the callus which has formed. If the graft has failed, the scion bud, now considerably shrivelled, can easily be rubbed out with the finger. If the graft has satisfactorily taken, the stock is now cut off with the secateur at "C," Fig. 3. On no account should it be cut any closer to the bud, as the stock would be liable to die back on the opposite side to the bud. A stub or butt of the old stock 5 or 6 inches long should be left above the graft, which will be finally removed a year later. Should the graft have failed, the vine is allowed to remain until September or October (in Victoria), when it can be cut back at "B," Fig. 3, and cleft grafted in the usual way. The *Yema* graft should be placed about 3 inches above the level of the soil, so that, in case of its failure, the cleft graft will not be so deep as to entail trouble with scion roots.

## SIMILAR GRAFTS IN FRANCE.

Curiously enough, this graft does not seem to have found its way to France; at least not during the period of active reconstitution (1885-99), during which French ingenuity devised an extraordinary number of new methods for budding and grafting the vine. It is not described in "Grafting and Budding,"* though the grafts of Besson, Massabie, and of Clarac (No. 2) present some points in common with it. These, however, are buds rather than grafts. The form of grafting which most resembles it, especially as regards the season for its execution, is the well-known Cadillac graft—a side cleft summer graft which will be described later.

A graft was, however, described in the *Progres Agricole,* of 25th February, 1912, by M. J. B. Maïs, which is practically identical with the Spanish Yema, second style,† as will be seen by reference to Fig. 4.

The following extracts from Mr. Maïs' article will, no doubt, prove of interest:—

Stocks (ungrafted) should be planted from December to March (June to September in Australia). As soon as the shoots are about an inch long a bud is placed, as shown in Fig. 4 (scion A, stock B), and tied with raffia.

One-third of the thickness of the stock is removed, and in its place is fitted one-third of the scion cane bearing a bud. This bud rots and makes way for two or three smaller buds which develop around it, sending out canes of three and four yards long the following season.

After the 10th August (February in Australia) the work may be continued, the buds being taken from the current season's canes. After

* New Methods of Grafting and Budding, as applied to Reconstitution with American Vines, by Dubois and Wilkinson—published by the Department of Agriculture of Victoria in 1901.

† J. B. Maïs, President, Syndicat Agricole of Lectoure (Gers), France, in "Progres Agricole," Montpellier, 25th February, 1912.

the 10th September (March in Australia) cold rains are likely to render results uncertain. During the currency of the whole summer it is difficult, a month after grafting, to tell that there has been a graft at all so perfect is the union. Needless to say, scions for grafting until July should be preserved in nearly dry sand and in the dark if possible. Should the first graft fail, another can be placed in position in August (February in Australia) about an inch below it. Should this fail also, the ordinary cleft graft can still be practised the following spring, thus assuring thorough success throughout the whole vineyard.

The vigour of plantations thus established is much superior to those planted with grafted rootlings up to the fifth year; afterwards, the difference is less noticeable. This enhanced vigour is explained, first, by the suppression, so to speak, of the graft (the union being so perfect),

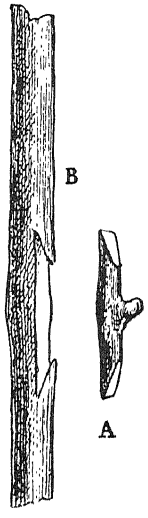



FIG. 4.

and second, by the fact that when wild vines (ungrafted resistant rootlings) are planted they have often ten or fifteen roots, whereas with grafted rootlings there are sometimes only one or two; furthermore, by leaving the wild vine to itself during the whole of the first season, it grows much more than its grafted neighbour, and as a result its roots penetrate more deeply and develop more vigorously, thus stimulating the growth of the scion much more during the second year.

If grafted in August-September (February-March here) all the canes of the stock should be severely topped in order to give a check to the sap, such as will bring about a rapid union (*soudure*).

One man can easily do 350 to 400 grafts a day. The scions should be cut beforehand and kept fresh in a piece of wet bag; in order to make rapid progress, it is necessary to have a choice of scions, owing to the difference in diameter of the stocks.

In spring it is well to drive in a small stake to each vine; owing to their vigour, the wind might break them out, thus causing blanks.

Fig. 4 is reproduced from Mr. Maïs' article.

# Tropical Industries.

## TOTAL PRODUCTION OF THE WORLD'S RUBBER.

A correspondent of the "Times Trade Supplement" writes:—

"The world's production of rubber for the year 1916, which will be on a greatly increased scale owing to the fact that much of the acreage planted at the time of the rubber boom five or six years ago will now be coming into the market, will probably not be far short of 170,000 tons. It is estimated on good authority that the total supply for 1915 was 107,000 tons from plantations, 37,000 tons from Brazil, and 13,600 tons from all other sources, and while the war lasts it appears likely that even this enormous output can be absorbed, notwithstanding the entire closure of the Middle European markets, which before the war took about 14,000 tons of rubber annually. During the present year it is probable that some 25,000 tons in excess of 1915 will be marketed, and we may assume that low prices will continue. The average price of rubber throughout 1914 was 2s. 3½d. per lb., while last year, in consequence of the considerable increase in value during the latter part of the time, the price worked out at 2s. 6d. per lb. Unless new calls for rubber, greatly exceeding present requirements, should arise, the existing value of 2s. 3d. to 2s. 6d. per lb. seems likely to hold good, and the 1916 average will probably be much the same as that of 1915.

"As to future prices, it must be remembered that for some time to come we are faced with an annual increment from planted rubber of not less than 30,000 tons, owing to the enormous new areas under cultivation coming forward each year. The acreage of rubber in the plantation of the Middle East probably now exceeds 800,000 acres, and taking the low estimate of 300 lb. per acre and the price of 2s. per lb., we may assume that when the whole of these trees are mature the annual value of the rubber crop may reach £24,000,000. If the cost of production is assumed to be 1s. per lb., which even now has been found practicable on many large estates, we obtain from rubber at 2s. per lb. a very handsome profit on the capital outlay, since £15 per acre profit would pay 10 per cent. on an outlay of £150 per acre. Although it is both difficult and hazardous to predict the future course of prices, we are of opinion that rubber will not be likely to fall below 2s. per lb. for many years to come."

On the yield of rubber per acre, the "Times" states:—

"Though it would not be prudent to base our estimates on what must be regarded as the phenomenal yields of certain estates, we think that it will be found in the long run that from 400 lb. to 450 lb. per acre will be a fair crop for mature plantations in the best parts of the Malay Peninsula. We are aware that the Seafield Estate last year gave an average of 682 lb. per acre from an area of 124 acres, planted in 1904, that is to

say, from trees of ten or eleven years of age, and that from the entire area of 1,940 acres the average yield per acre was 439 lb. A very experienced planter, who bases his estimates on the tapping of the oldest trees, has stated with confidence regarding another property, that eventually all the trees may be expected to yield at the rate of 600 lb. per acre, but at present our knowledge of the effect on the life of the tree of tapping to this extent is very limited, and it may be that there is a point beyond which it will be found unwise to carry the process of extraction of latex. It will be seen that at 100 trees per acre a crop of 400 lb. is equivalent to a yield of 4 lb. per tree, which is in excess of the average of mature trees, even if widely planted. Mr. H. Wright tells us that a fair average from young and old trees would be 2 lb. per tree, but the yield depends upon many different factors, and is greatly influenced by the system of tapping adopted."

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## COIR AND ITS PREPARATION.

(From the "Fiji Planters' Journal," April, 1917.)

Coir, the fibre from the husk of the coconut, is best (finest, most lustrous, and most resilient) when taken from the immature nuts, eight to ten months old. The practice, however, of using green husks for fibre would reduce the output of copra, a much more valuable product. Unless extra prime articles are wanted, the husks from ripe nuts are very satisfactory. At present these husks are practically valueless except in places where they are used as fuel. This state of affairs is causing the waste of a commodity which has the world for its market, and a broad field of uses opens to its application. The partly-cleaned fibre is excellent for caulking boats to prevent the water from entering. The clean fibre is used, without further preparation, for upholstering and for stuffing cushions and mattresses. Mr. Wright, of the Wright Furniture Company, Manila, says that well-cleaned fibre at 6 centavos per kilo could be used by his company in great quantities. When twisted into ropes and cables, coir is used by ships where the waves jerk and pull incessantly and where resiliency as well as strength is needed. Coir is without a peer where sudden heavy strains are placed upon it. Doormats and hall matting of coconut fibre are in demand throughout Christendom.

For ropes and mats the fibre should be well cleaned. This may be done in any one of several ways, three of which are worthy of mention here. In most Oriental countries where coir articles are made, the husks undergo a long period of retting. They are buried in pits along the seashore where the constant change of tidal water keeps them wet without permitting decay. The husks are left in these pits for from eight to ten months, causing the corky pulp to soften and disintegrate to such an extent that the fibres may be separated from it and thoroughly cleaned with very little subsequent labour. The retting process is sometimes carried on in vats of fresh water; but this system is very unsatisfactory, since the husk decays and the fibre becomes weak and of diminished value.

Machines have been tried for cleaning coir, but they have thus far been only a partial success. The husk is soaked to soften the pulp somewhat and is then fed by hand, a small section at a time, to a series of comb-like wheels. As these wheels can shred only one end of a section at a time, the piece must be fed in, withdrawn, reversed, and fed in again, to each of the wheels. These clutch wheels, as they are called, are graded from coarse to fine, as are the cards which follow them for the purpose of further loosening the pulp and combing the fibre. The partly-cleaned fibre is then thrown into a drum, where it is beaten and shaken to remove the dust and impurities, after which it is carded again and is ready for use. Theoretically this is all right; but in practice fibres are broken and poorly cleaned; and the hand feed makes the process slow.*

In the third method the husks, after the outer glossy part is crushed to admit of the free permeation of water, are soaked for a period of twenty-four hours. (It may be found necessary to place a weight on the husks to keep them covered by the water.) They are then taken out, the glossy part peeled off, and the husk beaten on the concave side with a mallet until the fibres are finely separated and the pulp is thoroughly loosened. Rubbing and shaking before all the pulp is beaten loose only lengthens the process. Beating the convex side of the husk before the fibres are all separated causes the husk to split up into segments instead of being divided into its component fibres by the elimination of the pulp. After the fibres have been separated, the dust is shaken out and the material is ready for washing and picking apart still further to get rid of the last of the extraneous matter. Drying completes the process.—Charles F. Fraker, in the "Philippine Craftsman."

## HOW TO MAKE A PERMANENT WHITEWASH.

A first-class whitewash which will not rub off is made by dissolving 2 lb. of ordinary glue in 7 pints of water, and when all is dissolved, adding 6 oz. of bichromate of potassium, dissolved in a pint of hot water. Stir the mixture up well, and then add sufficient whiting to make it up to the consistency of thick cream. Apply with a brush in the ordinary manner, as quickly as possible. This dries in a very short time, and, by the action of light, becomes converted into a perfectly insoluble waterproof substance, which does not wash off, even with hot water, and at the same time, does not give rise to mould growth, as whitewash made with size often does. It may be coloured to any desired shade by the use of a trace of any aniline dye.

Or 1 peck of lime slaked in boiling water, and kept just covered by the water while slaking. Strain through coarse cloth. Add 2 quarts of fine salt dissolved in warm water, 1 lb. of ricemeal boiled in water to a thin paste, ¼ lb. of whiting, and ½ lb. of glue dissolved in warm water. Mix all thoroughly, and let stand covered for two or three days; stir occasionally. Heat the mixture before using.

* *See* "Queensland Agricultural Journal," Sept., 1912, "The Coir Industry," Vol. xxix. p. 4.

# Botany.

## ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, Acting Government Botanist.

No. 7.

### "GRASS SEED" OR "MACKIE'S PEST" (*Chrysopogon aciculatus*, Trin.).

*Description.*—A shortly creeping grass, with erect stems about 1 ft. high. Leaves short. Inflorescence (seed-head) a narrow compact panicle, 3-4 in. long, with numerous slender branches. Spikelets narrow, 2½-3 lines long. Awn (bristle) short and fine.

A native of tropical Asia, Australia, and South Pacific Islands.

There are comparatively few grasses that can definitely be said to be noxious, but with the species under notice there can be but little doubt but what it must be placed under that category.

The grass is continuously being sent in for determination from the more tropical parts of the State, and has recently made its appearance in Southern Queensland.

Mr. E. Jarvis (Government Entomologist, Gordonvale) writes:—"We have a few exceedingly noxious weeds here, the worst of which is the so-called 'grass-seed,' perhaps not a weed in the strict sense of the word, but nevertheless a veritable scourge which takes most of the pleasure off collecting in the bush."

Mr. W. F. Bevington writes: "This grass is known as 'Mackie's Pest' here (Mulgrave River), and it is indeed a pest. It usually takes an hour to get the grass-seeds out of one's clothes."

C. S. Crosby, writing on the vegetation of Vavau, one of the Tonga Islands ("Journ. Linn. Soc. Bot. 35," p. 22) states: "The awns cleave to one's socks and are apt to produce irritating sores which may confine the sufferer to his couch for months."

*Uses.*—Its sharp pointed awned seeds militate against its use as a fodder. Mr. B. Jardine, of Somerset, in forwarding specimens for identification, stated that it had been brought over from Papua, and proved a suitable cover for cocoanut plantations in the Philippine Islands. According to Safford ("Useful Plants of the Island of Guam") the straw is used for making hats and mats.

*Eradication.*—In small areas hand-forking and burning. In paddocks ploughing out and planting with some strong-growing superior grass likely to smother it, as *Paspalum dilatatum*. The grass is scarcely a weed of cultivation, its greatest holds being in old deserted plantations and along road sides. In such localities spraying might prove successful.



PLATE 14.—"GRASS SEED" OR "MACKIE'S PEST" (*Chrysopogon aciculatus*).

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH MARCH TO 26TH APRIL, 1917.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Lady Dorset | Ayrshire ... ... | 14 Sept., 1916 | 697 | 4·8 | 39·45 | |
| Sylvia II. ... | Shorthorn... ... | 16 Jan., 1917 | 690 | 4·8 | 39·06 | |
| Hedges Madge | Holstein ... ... | 22 Mar. ,, | 779 | 4·2 | 38·45 | |
| Lady Melba | ,, ... ... | 14 Feb. ,, | 902 | 3·4 | 35·84 | |
| Iron Plate ... | Jersey ... ... | 9 Dec., 1916 | 478 | 6·3 | 35·68 | |
| Miss Edition | ,, ... ... | 25 Dec. ,, | 705 | 4·3 | 35·67 | |
| Violette's Peer's Girl | ,, ... ... | 13 Dec. ,, | 484 | 6·2 | 35·55 | |
| Glade ... | Shorthorn... ... | 29 Mar., 1917 | 599 | 4·4 | 31·02 | |
| Cocoatina ... | Jersey ... ... | 6 Mar. ,, | 647 | 3·9 | 29·60 | |
| Comedienne | ,, ... ... | 24 Nov., 1916 | 442 | 5·6 | 29·27 | |
| Thornton Fairetta | ,, ... ... | 26 May ,, | 302 | 8·0 | 28·72 | |
| Miss Betty | ,, ... ... | 27 Mar., 1917 | 637 | 4·1 | 28·68 | |
| Lady Spec... | Ayrshire ... ... | 17 Jan. ,, | 640 | 3·8 | 28·51 | |
| Lady Annette | ,, ... ... | 11 Nov., 1916 | 501 | 4·8 | 28·36 | |
| Miss Bell ... | Jersey ... ... | 1 Aug. ,, | 396 | 6·0 | 28·13 | |
| Constancy ... | Ayrshire ... ... | 27 Dec. ,, | 553 | 4·3 | 27·98 | |
| Twylish's Maid | Jersey ... ... | 2 Nov. ,, | 390 | 6·0 | 27·71 | |
| Belinda ... | Ayrshire ... ... | 23 Feb., 1917 | 557 | 4·0 | 26·15 | |
| Sweet Meadows | Jersey ... ... | 18 Aug., 1916 | 242 | 8·2 | 23·59 | |
| Glen ... | Shorthorn... ... | 18 Jan., 1917 | 461 | 4·4 | 23·87 | |
| Jeannie ... | Ayrshire ... ... | 27 Oct., 1916 | 467 | 4·2 | 23·04 | |
| Charity ... | Jersey ... ... | 8 Jan., 1917 | 256 | 7·5 | 22·80 | |
| Nina ... | Shorthorn... ... | 23 June, 1916 | 436 | 4·4 | 22·58 | |
| Glow 6th ... | Guernsey ... ... | ? | 358 | 5·1 | 21·55 | |
| Mistress Bee | Jersey ... ... | 11 Jan., 1917 | 336 | 5·3 | 21·04 | |
| Hedges Dutchmaid | Holstein ... ... | 22 Aug., 1916 | 405 | 4·4 | 20·97 | |
| La Hurette Hope | Jersey ... ... | 6 Oct. ,, | 289 | 6·1 | 20·86 | |

The cows were grazed on natural pastures only.

## PRACTICAL BACON-CURING.

The season is approaching when the farmer's pig for home consumption will be ready for slaughter. We have given several recipes for curing bacon and hams; still, we may always gain a good hint from our friends over the sea. Durban, South Africa, through the medium of the "Agricultural News," supplies the following recipe:—

"People often desire details of a simple method of curing bacon. The following practical hints will be found most useful for carrying out on the farm:—

"After killing, let the pig hang overnight and cure the next day. If the intention is to roll the bacon, saw or cut the carcass into two equal sides and remove the ribs, shoulder-blade, and ham bones; if the bacon is not to be rolled, and the pig should weigh over 100 lb., remove the ribs (which can be used fresh or salted), cut off the ham, which should be round, and cut off shoulders straight across. If the pig is a large one, say, 150 lb., remove the shoulder-blade, as it is somewhat difficult to cure.

"*Salting.*—For a pig of 120 lb. use about 8 lb. or 10 lb. of salt, 2½ oz. of saltpetre, 1½ lb. sugar, 2 oz. ground allspice; mix these well and thoroughly, and rub into the meat, for which purpose a trough made of 2 in. deal may be used—18 in. wide at the bottom, 2 ft. wide at top, 3 ft. 2 in. long, and 1 ft. 10 in. deep, inside measurement. This has proved excellent for long sides.

"Sprinkle a fair quantity of the salt mixture in the bottom of the trough, and place the sides in, skin downwards; seven days after placing in trough remove the sides, sprinkle a little of the salt mixture over them, and replace in the trough, but be careful to reverse the position by placing the side that was first on top now at the bottom of the trough, and the bottom one at the top. Repeat this process on the fourteenth day, and at the end of the third week remove from the trough.

"*Salting and Rolling.*—In a pan of water wash away all surplus salt from the sides, and hang up to dry for a day. Many are strong believers in the dry-salting, but allow the brine that accumulates in the trough to remain there until the bacon is cured. A day or two after the bacon is taken from the trough is the best time for rolling, and rolling of bacon must be regarded as anything but a success unless it is done thoroughly tight and solid.

"Only the best cord should be used. The smoking of bacon is most important. There is no necessity for the average farmer to build an elaborate smoke-house. A large drapery case, about 3 ft. 6 in. square, will answer the purpose very well, using the boards from the cover and bottom to make the sides, say, 5 ft. high. This can be easily done by using 2 in. by 3 in. deal battens, 5 ft. long, one for each corner, and nail securely. Never place the fire for smoking underneath the bacon, but dig a trench about 6 in. deep and 9 in. wide, running from under the smoke-house to about 6 ft. back.

"Farmers who have tried this formula have found it comparatively simple."

# General Notes.

## DENATURED ALCOHOL.

What does denatured alcohol mean? To the majority of persons alcohol means liquor—something to drink—but few know that beyond its use as a stimulant, and to some extent, in the arts and as a fuel, it is also a source of power as a substitute for gasolene, petroleum, and kindred hydrocarbons. When the Denaturing Act was passed by the American Congress, about the year 1907, alcohol leaped into fame, not as an intoxicant, or as the humble servant of the lamp, but as a new farm product for use in farm engines, motors, heating, lighting, &c.

In 1916 H. Hamel Smith, editor of "Tropical Life," wrote that the Russian Minister of Finance was organising an international competition, with prizes ranging up to £3,000, for methods of rendering methylated spirits and similar harmful liquids absolutely undrinkable, and a second competition was being arranged, with prizes up to £7,500, for new or improved methods of utilising alcohol for combustible or other purposes. The total awards would amount to nearly £68,000.

"Tropical planters," said Mr. Smith, "and others in all parts of the world, should take an interest in this contest, and try to induce their respective Governments to do the same, as the enormous amount of raw material that is made available every year from the waste products of manila fibre, banana, coconut, sugar, cacao, and other industries would allow an output of alcohol suitable for fuel and other purposes sufficient to enable the British Empire and her Allies to be independent of unfriendly nations for their supply of spirit for such purposes."

Denatured alcohol is simply alcohol which has been so treated as to spoil it for use as a beverage or medicine, and prevent its use in any manner except for industrial purposes. Denaturing can be accomplished in many ways. In England a mixture suitable for industrial purposes, but unfit for any other use, is made by mixing 90 per cent. of ethyl alcohol (alcohol made from grain, potatoes, beets, &c.) with 10 per cent. of methyl, or "wood alcohol." In Germany some of the other denaturants are camphor, chloroform, iodoform, ethyl bromide, benzine, castor oil, &c.

Mr. F. B. Wright, U.S.A., in a very interesting work on the subject, gives full details as to the various methods of producing the desired results, and mention is made of the uses to which denatured alcohol may be put. For instance, he says it is a safe fuel.

"Although it has only about half the heating power of kerosene or gasolene, gallon for gallon, yet it has many valuable properties which may enable it to compete successfully, in spite of its lower fuel value. In the first place, it is very much safer. Alcohol has a tendency to simply heat the surrounding vapours and produce currents of hot gases which are not usually brought to high enough temperature to inflame articles at a distance. It can be easily diluted with water, and when so diluted, no more than one-half, it ceases to be inflammable. Hence it may readily be extinguished, while burning gasolene, by floating on the water, simply spreads its flame when water is applied to it.

"When alcohol is used for lighting purposes, the general estimate of its value gives it about double the power of kerosene, a gallon of alcohol lasting as long as 2 gallons of the oil. When used for street lighting, alcohol vapour burns like gas with an incandescent flame in a hooded flame covered by a Welsbach mantle. This light rivals the arc light in brilliancy, and requires to be shaded to adapt it to the endurance of the human eye. Alcohol can also be employed in the same manner as gas in cooking stoves."

Mr. J. C. Brünnich, Agricultural Chemist, writing on Neglected Industries, dilated on the shortage of methylated spirit in Brisbane. The following notes on his article were published in our original article on Denatured Alcohol in the *Queensland Agricultural Journal* in July, 1916, but they are well worth repeating, as they have been in the "Journal of the Jamaica Agricultural Society" (vol. xxi., January, 1917) :—

He said, he was unable to understand why we did not make good the shortage by manufacture from other materials such as maize, of which the Atherton district at present had a record crop. A bushel of maize (56 lb.) would yield about 5 U.S. gallons of proof spirit, or 2½ gallons of absolute alcohol. One gallon of molasses would yield about four-tenths of a gallon of alcohol. One bushel of sweet potatoes (54 lb.) would give about half a gallon of absolute alcohol, and ordinary potatoes might be expected to give a similar quantity.

Mr. Brünnich said that another excellent article very largely used in America was cassava (arrowroot), which was known to yield very heavy crops in some parts of Queensland, and this would give about the same amount of alcohol as sweet potatoes.

The Agricultural Chemist pointed out that alcohol could be used for driving gas engines for ordinary running, but it had not been found suitable for running motor-cars, as it had not the flexibility of petrol, such as

is required for frequent starting, and running at slow speed. The difficulty was reported to have been overcome in Germany by the addition of a certain amount of benzol (benzene), which was a by-product of coal distillation, and which could be produced in this country. Alcohol, however, could be used in certain classes of lamps, and it was one of the cheapest of fuels and sources of light.

A secondary product of alcohol was acetic acid, which was also in very short supply. Mr. Brünnich suggested spoiled pineapples and apples as sources of supply. In connection with the latter crop, visitors to Southern States had said that the waste of apples owing to difficulties of transport was extraordinary.

Mr. Brünnich expressed the opinion that little or no kerosene should be imported into Australia; it could be largely, if not entirely, replaced by the production of our own alcohol. He pointed out that there were numerous other products which could be produced in Australia at a profit at present prices—even if not profitable to produce under normal conditions.

## TO WATERPROOF CLOTHING.

Clothing of unbleached calico may be waterproofed by soaking the material in hot water and hanging it out to dry. Then take as much boiled oil as is necessary, and mix enough lampblack with it to blacken it. For yellow coats, use ground yellow ochre instead. Then lay the fabric on a smooth surface, and put the oil on with a paint brush. Let the first coat get dry before applying another. Lay the oil on as thin as possible. A little gold size will make it dry quicker, say half a pound to 1 gallon of oil. Three coats of oil are usually given. If the last coat remains sticky after it is dry, take 1 lb. shellac and simmer gently with 2 quarts water, and, when near boiling, add a little liquid ammonia. If for a black coat, add a little lampblack to it when cold, and apply it to the coat with a sponge.

## PRICKLY-PEAR JELLY.

Rub off the spines very carefully with a thick cloth. Cut the fruit in half, and for every pound allow a pound of water. Boil till the fruit is almost a pulp. Strain away the liquid, and for every pint add the juice of a lemon and a pound of sugar. Simmer gently, removing any scum, until the syrup jellies. Cover down with parchment paper and store for future use. Jelly-making is more suitable for this fruit than jam-making, although the latter can be made by cutting the fruit in half, and then into small pieces, allowing pound for pound of sugar and fruit with very little water in the bottom of the pan, or the colour, like Rosella jam or jelly, would be easily spoiled.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR APRIL, 1917.

| Article. | | APRIL. |
|---|---|---|
| | | Prices. |
| Bacon | lb. | 9d. to 1s. |
| Barley | bush. | 3s. to 4s. |
| Bran | ton | £5 |
| Broom Millet | „ | £22 to £24 |
| Butter | cwt. | 149s. 4d. |
| Chaff, Mixed | ton | £3 10s. to £4 |
| Chaff, Oaten | „ | £3 5s. |
| Chaff, Lucerne | „ | £3 10s. |
| Chaff, Wheaten | „ | ... |
| Cheese | lb. | 9½d. |
| Flour | ton | £12 |
| Hams | lb. | 1s. 3d. to 1s. 4d. |
| Hay, Oaten | ton | £4 10s. |
| Hay, Lucerne | „ | £2 10s. |
| Honey | lb. | 4½d. |
| Maize | bush. | 2s. 4½d. |
| Oats | „ | 3s. to 4s. |
| Onions | ton | £7 10s. to £10 |
| Peanuts | lb. | 2½d. to 3d. |
| Pollard | ton | £6 12s. 6d. |
| Potatoes | „ | £7 15s. to £8 10s. |
| Potatoes (Sweet) | cwt. | 2s. 3d. to 3s. 3d. |
| Pumpkins (Cattle) | ton | £3 to £3 5s. |
| Eggs | doz. | 1s. 2d. to 2s. 3d. |
| Fowls | pair | 4s. to 6s. 7d. |
| Ducks, English | „ | 3s. 6d. to 4s. |
| Ducks, Muscovy | „ | 4s. 4d. to 7s. 6d. |
| Geese | „ | 6s. 9d. |
| Turkeys (Hens) | „ | 7s. to 8s. 6d. |
| Turkeys (Gobblers) | „ | 13s. to 15s. |
| Wheat | bush. | 3s. 9d. |

## VEGETABLES—TURBOT STREET MARKETS.

| | |
|---|---|
| Asparagus, per bundle | ... |
| Cabbages, per dozen | 4s. 6d. to 10s. |
| Cauliflowers, per dozen | ... |
| Celery, per bundle | ... |
| Cucumbers, per dozen | 9d. to 1s. |
| Beans, per sugar bag | 3s. 6d. to 6s. |
| Peas, per sugar bag | 4s. to 7s. 6d. |
| Carrots, per dozen bunches | 10d. to 1s. |
| Chocos, per quarter-case | 1s. 3d. to 2s. |
| Beetroot, per dozen bunches | ... |
| Marrows, per dozen | 2s. 6d. to 4s. 6d. |
| Lettuce, per dozen | 1s. to 2s. |
| Parsnips, per bundle | 6d. to 8d. |
| Sweet Potatoes, per sugar bag | 1s. 3d. to 1s. 6d. |
| Table Pumpkins, per dozen | 2s. to 4s. |
| Tomatoes, per quarter-case | 4s. to 7s. |
| Vegetable Marrows, per dozen | ... |
| Turnips, per dozen bunches | 10d. to 1s. |
| Rhubarb, per dozen bundles | ... |

## SOUTHERN FRUIT MARKETS.

| Article. | APRIL. Prices. |
|---|---|
| Bananas (Queensland), per case | 6s. to 12s. |
| Bananas (Fiji), per case | 12s. to 14s. |
| Bananas (G.M.), per case | 13s. 6d. to 16s. |
| Custard Apples, per 12 to 15 tray | 3s. 6d. to 5s. 6d. |
| Lemons (Local), per bushel-case | 2s. to 5s. |
| Mandarins, per case | 5s. to 8s. |
| Oranges (Navel), per case | 10s. to 15s. |
| Oranges (other), per case | 5s. to 8s. |
| Papaw Apples, per half-bushel-case | 7s. to 9s. |
| Passion Fruit, per half-case | 1s. 6d. to 6s. 6d. |
| Persimmons, per half-case | 1s. 6d. to 3s. 6d. |
| Pineapples (Queens), per double-case | 6s. to 8s. |
| Pineapples (Ripleys), per double-case | 5s. to 7s. |
| Pineapples (Common), per double-case | 4s. to 6s. |
| Tomatoes (Queensland), per half-bushel-case | 1s. 6d. to 3s. 6d. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | APRIL. Prices. |
|---|---|
| Apples, Eating, per case | 7s. 6d. to 10s. |
| Apples, Cooking, per case | 6s. to 8s. |
| Bananas (Cavendish), per dozen | 1½d. to 3d. |
| Bananas (Sugar), per dozen | 2½d. to 3½d. |
| Citrons, per hundredweight | 9s. to 10s. |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per quarter-case | 3s. 6d. to 4s. 9d. |
| Custard Apples, per quarter-case | 3s. to 5s. |
| Granadillas, per quarter-case | ... |
| Grapes, per lb. | 5d. to 6d. |
| Lemons (Lisbon), per quarter-case | 4s. to 7s. 6d. |
| Limes, per quarter-case | 3s. to 4s. 6d. |
| Mandarins | 4s. to 5s. |
| Nectarines, per quarter-case | 1s. to 3s. |
| Oranges (Navel), per case | 9s. to 10s. |
| Oranges (other), per case | 4s. to 6s. |
| Papaw Apples, per case | 2s. to 3s. |
| Passion Fruit, per quarter-case | 3s. to 4s. |
| Peaches, per quarter-case | 1s. 3d. to 3s. 6d. |
| Pears, per quarter-case | 4s. 6d. to 5s. 6¼d. |
| Peanuts, per lb. | 2d. to 4d. |
| Persimmons, per quarter-case | 4s. to 5s. |
| Plums, per quarter-case | 4s. to 5s. |
| Plums (prime eating), per case | ... |
| Pineapples (Ripleys), per dozen | 1s. 6d. to 3s. 6d. |
| Pineapples (Rough), per dozen | 2s. 6d. to 5s. |
| Pineapples (Smooth), per dozen | 1s. 9d. to 5s. |
| Quinces, per quarter-case | 3s. |
| Rosellas, per sugar bag | 2s. to 3s. |
| Tomatoes, per quarter-case | 2s. 6d. to 5s. 3d. |
| Watermelons, per dozen | ... |

## TOP PRICES, ENOGGERA YARDS, MARCH, 1917.

| Animal. | MARCH. Prices. |
|---|---|
| Bullocks ... ... ... ... ... ... ... ... | £19 10s. to £25 5s. |
| Bullocks (Single) ... ... ... ... ... ... | ... |
| Cows ... ... ... ... ... ... ... ... | £11 10s. to £14 17s. 6d. |
| Merino Wethers ... ... ... ... ... ... | 42s. 6d. |
| Crossbred Wethers ... ... ... ... ... ... | 44s. 6d. |
| Merino Ewes ... ... ... ... ... ... ... | 30s. 9d. |
| Crossbred Ewes ... ... ... ... ... ... ... | 44s. 6d. |
| Lambs ... ... ... ... ... ... ... ... | 40s. |
| Pigs (Stores) ... ... ... ... ... ... ... | 30s. |

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MARCH IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MARCH, 1917 AND 1916, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. Mar. | Average Rainfall. No. of Years' Records. | Total Rainfall. Mar., 1917. | Total Rainfall. Mar., 1916. |
|---|---|---|---|---|
| *North Coast.* | In. | | In. | In. |
| Atherton ... ... | 9·19 | 15 | 6·59 | 3·76 |
| Cairns ... ... | 19·25 | 34 | 11·66 | 5·74 |
| Cardwell ... ... | 16·98 | 44 | 12·35 | 6·34 |
| Cooktown ... ... | 15·39 | 40 | 11·13 | 16·11 |
| Herberton ... ... | 8·54 | 29 | 9·98 | 3·67 |
| Ingham ... ... | 16·69 | 24 | 13·44 | 13·81 |
| Innisfail ... ... | 26·58 | 35 | 16·34 | 15·33 |
| Mossman ... ... | 16·87 | 4 | 24·25 | 6·10 |
| Townsville ... ... | 8·36 | 45 | 9·31 | 7·06 |
| *Central Coast.* | | | | |
| Ayr ... ... ... | 8·19 | 29 | 4·91 | 4·02 |
| Bowen ... ... | 6·27 | 45 | 6·27 | 0·58 |
| Charters Towers ... | 3·79 | 34 | 3·70 | 2·75 |
| Mackay ... ... | 12·88 | 45 | 16·91 | 4·64 |
| Proserpine ... ... | 13·90 | 13 | 13·10 | 3·77 |
| St. Lawrence ... | 6·43 | 45 | 8·90 | 1·87 |
| *South Coast.* | | | | |
| Biggenden ... ... | 4·76 | 17 | 4·64 | 2·27 |
| Bundaberg ... ... | 5·73 | 33 | 10·71 | 3·26 |
| Brisbane ... ... | 5·97 | 66 | 2·79 | 1·38 |
| Childers ... ... | 5·61 | 21 | 6·63 | 2·19 |
| Crohamhurst ... | 12·30 | 25 | 8·71 | 3·06 |
| Esk ... ... ... | 5·16 | 29 | 4·02 | 3·27 |
| Gayndah ... ... | 3·37 | 45 | 2·22 | 1·40 |
| Gympie ... ... | 6·61 | 46 | 4·05 | 3·87 |
| Glasshouse M'tains | 10·19 | 8 | 8·64 | 2·00 |
| Kilkivan ... ... | 4·28 | 37 | 2·92 | 3·28 |
| Maryborough ... | 6·67 | 45 | 6·04 | 3·48 |
| *South Coast*—continued: | | | | |
| Nambour ... ... | 10·15 | 20 | 9·12 | 5·21 |
| Nanango ... ... | 3·46 | 34 | 3·10 | 2·19 |
| Rockhampton ... | 5·35 | 29 | 8·57 | 3·25 |
| Woodford ... ... | 8·87 | 29 | 5·78 | 2·08 |
| *Darling Downs.* | | | | |
| Dalby ... ... | 2·89 | 46 | 2·57 | 4·37 |
| Emu Vale ... ... | 2·95 | 20 | 0·96 | 1·30 |
| Jimbour ... ... | 2·79 | 28 | 2·35 | 3·43 |
| Miles ... ... | 2·85 | 31 | 5·09 | 4·54 |
| Stanthorpe ... | 2·88 | 43 | 1·04 | 1·28 |
| Toowoomba ... | 4·07 | 44 | 3·42 | 2·35 |
| Warwick ... ... | 3·11 | 29 | 0·88 | 1·18 |
| *Maranoa.* | | | | |
| Roma ... ... | 3·00 | 42 | 3·57 | 2·80 |
| *State Farms, &c.* | | | | |
| Bungeworgorai ... | 2·39 | 4 | 3·96 | 1·61 |
| Gatton College ... | 3·84 | 17 | 2·97 | 2·12 |
| Gindie ... ... | 2·98 | 17 | 10·65 | 1·34 |
| Hermitage ... | 3·16 | 10 | 0·80 | 1·56 |
| Kairi ... ... | 5·12 | 4 | 6·01 | 2·25 |
| Kamerunga ... | 18·00 | 26 | 8·81 | 5·15 |
| Sugar Experiment Station, Mackay | 12·95 | 19 | 11·25 | 3·48 |
| Warren ... ... | 3·16 | 4 | 5·49 | 2·84 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for March this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

# ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

## TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON

| 1917. | MAY. | | JUNE. | | JULY. | | AUGUST. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·13 | 5·17 | 6·32 | 4·59 | 6·40 | 5·4 | 6·30 | 5·18 |
| 2 | 6·13 | 5·16 | 6·32 | 4·59 | 6·40 | 5·4 | 6·30 | 5·18 |
| 3 | 6·14 | 5·15 | 6·33 | 4·59 | 6·40 | 5·4 | 6·29 | 5·19 |
| 4 | 6·15 | 5·14 | 6·33 | 4·59 | 6·40 | 5·5 | 6·29 | 5·19 |
| 5 | 6·15 | 5·14 | 6·33 | 4·59 | 6·40 | 5·5 | 6·28 | 5·20 |
| 6 | 6·16 | 5·13 | 6·34 | 4·59 | 6·40 | 5·5 | 6·28 | 5·20 |
| 7 | 6·15 | 5·12 | 6·34 | 4·59 | 6·40 | 5·6 | 6·27 | 5·21 |
| 8 | 6·17 | 5·12 | 6·34 | 4·59 | 6·40 | 5·6 | 6·26 | 5·21 |
| 9 | 6·17 | 5·11 | 6·35 | 4·59 | 6·40 | 5·6 | 6 25 | 5·22 |
| 10 | 6·18 | 5·11 | 6·35 | 4·59 | 6·39 | 5·7 | 6·24 | 5·22 |
| 11 | 6·19 | 5·10 | 6·35 | 5·0 | 6·39 | 5·7 | 6·23 | 5·23 |
| 12 | 6·20 | 5·9 | 6·36 | 5·0 | 6·39 | 5·8 | 6 22 | 5·23 |
| 13 | 6·21 | 5·9 | 6·36 | 5·0 | 6·39 | 5·8 | 6·21 | 5·24 |
| 14 | 6·21 | 5·8 | 6·36 | 5·0 | 6·39 | 5·9 | 6·20 | 5·24 |
| 15 | 6·22 | 5·8 | 6·36 | 5·0 | 6·38 | 5·9 | 6·19 | 5·25 |
| 16 | 6·23 | 5·7 | 6·37 | 5·0 | 6·38 | 5·10 | 6·18 | 5·25 |
| 17 | 6·23 | 5·7 | 6·37 | 5·0 | 6·38 | 5·10 | 6·17 | 5·26 |
| 18 | 6·24 | 5·6 | 6·37 | 5·0 | 6·37 | 5·11 | 6·16 | 5·27 |
| 19 | 6·24 | 5·6 | 6·37 | 5·0 | 6·37 | 5·11 | 6·15 | 5·27 |
| 20 | 6·25 | 5·5 | 6·38 | 5·0 | 6·36 | 5·12 | 6·14 | 5·28 |
| 21 | 6·25 | 5·5 | 6·38 | 5·1 | 6·36 | 5·12 | 6·13 | 5·28 |
| 22 | 6·26 | 5·4 | 6·38 | 5·1 | 6·35 | 5·13 | 6·12 | 5·29 |
| 23 | 6·27 | 5·3 | 6·38 | 5·1 | 6·35 | 5·13 | 6·11 | 5·29 |
| 24 | 6·27 | 5·3 | 6·38 | 5·1 | 6·34 | 5·14 | 6·10 | 5·30 |
| 25 | 6·28 | 5·2 | 6·39 | 5·2 | 6·34 | 5·14 | 6·9 | 5·30 |
| 26 | 6·29 | 5·2 | 6·39 | 5·2 | 6·33 | 5·15 | 6·8 | 5·31 |
| 27 | 6·29 | 5·1 | 6·39 | 5·2 | 6·33 | 5·15 | 6·7 | 5·31 |
| 28 | 6·30 | 5·1 | 6·39 | 5·3 | 6·32 | 5·16 | 6·6 | 5·32 |
| 29 | 6·30 | 5·0 | 6·39 | 5·3 | 6·32 | 5·16 | 6·5 | 5·32 |
| 30 | 6·31 | 5·0 | 6·39 | 5·3 | 6·31 | 5·17 | 6·4 | 5·33 |
| 31 | 6·31 | 4·59 | ... | ... | 6·31 | 5·17 | 6·3 | 6·33 |

The times given are for the whole of Queensland, New South Wales, and Victoria, where the same Standard Time is observed.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 7 May | ○ | Full Moon | 12 | 43 | p.m. |
| 14 „ | ☽ | Last Quarter | 11 | 48 | a.m. |
| 21 „ | ● | New Moon | 10 | 47 | „ |
| 29 „ | ☾ | First Quarter | 9 | 33 | „ |

The Moon will be nearest the earth on the 14th, and at its farthest distance on the 28th.

| | | | | | |
|---|---|---|---|---|---|
| 5 June | ○ | Full Moon | 11 | 7 | p.m. |
| 12 „ | ☽ | Last Quarter | 4 | 38 | „ |
| 19 „ | ● | New Moon | 11 | 2 | „ |
| 28 „ | ☾ | First Quarter | 2 | 8 | a.m. |

The Moon will be nearest the earth on the 9th, and at its farthest distance on the 25th. It will cause a partial Eclipse of the Sun on the 19th, visible in the Arctic Regions but not in Australia.

| | | | | | |
|---|---|---|---|---|---|
| 5 July | ○ | Full Moon | 7 | 40 | a.m. |
| 11 „ | ☽ | Last Quarter | 10 | 12 | p.m. |
| 19 „ | ● | New Moon | 1 | 0 | „ |
| 27 „ | ☾ | First Quarter | 4 | 40 | „ |

The moon will be nearest the earth on the 7th, and at its greatest distance on the 22nd. There will be a *Total Eclipse* of the *Moon* from 6·51 to 8·27 a.m. on the 5th; but only the moon's entrance into the shadow of the earth will be seen in Eastern Australia.

| | | | | | |
|---|---|---|---|---|---|
| 3 Aug. | ○ | Full Moon | 3 | 11 | p.m. |
| 10 „ | ☽ | Last Quarter | 5 | 56 | a.m. |
| 18 „ | ● | New Moon | 4 | 21 | „ |
| 26 „ | ☾ | First Quarter | 5 | 8 | „ |

The moon will be nearest the earth on the 4th, and at its greatest distance on the 18th.

*For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during May, June, and July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

* These notes will not again be published until September, as they apply to the series from May to August.

# Farm and Garden Notes for June.

FIELD.—Winter begins on the 24th of this month, and frosts will already have been experienced in some of the more exposed districts of the Southern coast and on the Darling Downs. Hence insect pests will, to a great extent, cease from troubling, and weeds will also be no serious drawback to cultivation. The month of June is considered by the most successful lucerne-growers to be the best time to lay down this crop, as any weeds which may spring up in the event of a dropping season will be so slow-growing that the young lucerne plants will not be choked by them.

The land should now be got ready for millets, sorghums, panicum, &c. Oats, barley, vetches, clover, tobacco, buckwheat, field carrots, and Swedes may now be sown. Some advocate the sowing of early maize and potatoes during this month, but obviously this can only apply to the more tropical parts of Queensland. The land may be got ready, but in the Southern districts and on the tableland neither maize nor potatoes should be planted before August or, at the earliest, in warm early districts, at the end of July. There is always almost a certainty of frosts, more or less severe, during these months. Arrowroot will be nearly ready for digging, but we would not advise taking up the bulbs until the frosts of July have occurred. Take up sweet potatoes, yams, and ginger. Should there be a heavy crop, and consequently a glut in the market, sweet potatoes may be kept by storing them in a cool place in dry sand, taking care that they are thoroughly ripe before digging. The ripeness may be known by the milky juice of a broken tuber remaining white when dry. Should the juice turn dark, the potato is unripe, and will rot or dry up and shrivel in the sand pit. Before pitting, spread the tubers out in a dry barn or in the open, if the weather be fine. In pitting them or storing them in hills, lay them on a thick layer of sand; then pour dry sand over them till all the crevices are filled and a layer of sand is formed above them; then put down another layer of tubers, and repeat the process until the hill is of the requisite size. The sand excludes the air, and the potatoes will keep right through the winter. Late wheat may still be sown, but it is too late for a field crop of onions. In tropical Queensland the bulk of the coffee crop should be off by the end of July. Yams may be unearthed. Cuttings of cinnamon and kola-nut tree may be made, the cuttings being planted under bell glasses. Collect divi-divi pods and tobacco leaves. English potatoes may be planted. The opium poppy will now be blooming and forming capsules. Gather tilseed (sesame), and plant out young tobacco plants if the weather be suitable. Sugar-cane cutting may be commenced. Keep the cultivator moving amongst the pineapples. Gather all ripe bananas. Fibre may be produced from the old stems.

KITCHEN GARDEN.—Cabbage, cauliflower, and lettuce may be planted out as they become large enough. Plant asparagus and rhubarb in well-prepared beds in rows. In planting rhubarb it will probably be found more profitable to buy the crowns than to grow them from seed, and the same remark applies to asparagus.

Sow cabbage, red cabbage, peas, lettuce, broad beans, carrots, radish, turnip, beet, leeks, and herbs of various kinds, such as sage, thyme, mint, &c. Eschalots, if ready, may be transplanted; also, horse-radish can be set out now.

The earlier sowings of all root crops should now be ready to thin out if this has not been already attended to.

Keep down the weeds among the growing crops by a free use of the hoe and cultivator.

The weather is generally dry at this time of the year, so the more thorough the cultivation the better for the crops.

Land for early potatoes should now be got ready by well digging or ploughing.

Tomatoes intended to be planted out when the weather gets warmer may be sown towards the end of the month in a frame where the young plants will be protected from frost.

FLOWER GARDEN.—No time is now to be lost, for many kinds of plants need to be planted out early to have the opportunity of rooting and gathering strength in the cool moist spring time to prepare them for the trial of heat they must endure later on. Do not put your labour on poor soil. Raise only the best varieties of plants in the garden; it costs no more to raise good varieties than poor ones. Prune closely all the hybrid perpetual roses; and tie up, without pruning, to trellis or stakes the climbing and tea-scented varieties, if not already done. These and other shrubs may still be planted. See where a new tree or shrub can be planted; get these in position; then they will give you abundance of spring bloom. Renovate and make lawns, and plant all kinds of edging. Finish all pruning. Divide the roots of chrysanthemums, perennial phlox, and all other hardy clumps; and cuttings of all the summer bedding plants may be propagated.

Sow first lot, in small quantities, of hardy and half-hardy annuals, biennials, and perennials, some of which are better raised in boxes and transplanted into the open ground, but many of this class can, however, be successfully raised in the open if the weather is favourable. Antirrhinum, carnation, picotees, dianthus, hollyhock, larkspur, pansy, petunia, *Phlox Drummondi*, stocks, wallflower, and zinnias, &c., may be sown either in boxes or open beds; mignonette is best sown where it is intended to remain.

To grow these plants successfully, it is only necessary to thoroughly dig the ground over to a depth of not less than 12 in., and incorporate with it a good dressing of well-decayed manure, which is most effectively done by a second digging; the surface should then be raked over smoothly,

so as to remove all stones and clods, thus reducing it to a fine tilth. The seed can then be sown in lines or patches as desired, the greatest care being taken not to cover deeply; a covering of not more than three times the diameter of larger seeds, and a light sprinkling of fine soil over small seeds, being all that is necessary. A slight mulching of well-decayed manure and a watering with a fine-rosed can will complete the operation. If the weather prove favourable, the young seedlings will usually make their appearance in a week or ten days; thin out so as to leave each plant (if in the border) at least 4 to 6 in. apart.

# Orchard Notes for June.

## THE SOUTHERN COAST DISTRICTS.

The Notes of last month, referring to the care to be taken in the handling and marketing of all kinds of citrus fruits, apply with equal force during this and subsequent months till the end of the season.

Keep the orchard clean, and work the land to retain moisture. The handling of the citrus crop is the main work in many orchards, but where slowly acting manures are to be given their application should not be later than this month. They should be well mixed with the soil, so that when Spring comes and the trees start a fresh growth a certain percentage of plant food will be available for the trees' use. Heavy pruning should be done now, whilst the trees are dormant. All large limbs should be cut off close to the main stem; the edges of the cuts should be carefully trimmed, and the whole wound, if of large size, covered with paint or grafting wax, so that it will not start to decay but soon grow over. When the soil of the orchard is becoming deficient in organic matter, the growing of a Winter green crop, such as mustard or rape, is well worth a trial. Clear the crop of fruit from the part of the orchard to be so treated. Plough the land well; work the soil down fine so as to get a good seed bed, and broadcast the mustard or rape. A manuring of 4 cwt. of meatworks manure and 1 cwt. of sulphate of potash per acre will produce a very heavy crop of green manure, and the plant food not required for the production of such crop will be still available for the trees' use in Spring.

Pineapples and bananas should all be cleaned up, and the land got into first-class order. Pineapples, where at all liable to frost, should be covered with grass or other suitable material. The growth of weeds between the rows of pines on land liable to frost is one of the best ways of encouraging frost, as frost will strike dirty, weedy ground, and severely injure the pines growing thereon, when it will do little, if any, damage where the land is kept perfectly clean—another advantage of cleanliness in cultivation.

## THE TROPICAL COAST DISTRICTS.

Keep the land well cultivated—plough when necessary to bury weed growth, and get the surface of the ground into a state of thorough tilth, as moisture must be retained in the soil by cultivation to mature the Spring Crop of fruit. This applies not only to oranges and other tree fruits, but to bananas and pines as well. A good start in Spring means good bunches of bananas and early-ripening pineapples. Heavy pruning can be done now in the case of all trees not carrying a heavy crop of fruit; but where citrus trees are heavily loaded, the pruning should be put off till after the Spring crop of fruit has been gathered. The spraying of the trunks and inside of the trees with the lime and sulphur wash can be carried out, and where Maori is making its appearance the sulphide of soda wash should be used as well.

## THE SOUTHERN AND CENTRAL TABLELANDS.

The pruning of all kinds of deciduous fruit trees is the chief work of the month in the Stanthorpe district. Do not be frightened to prune severely—first, in the case of young trees, so as to get strong well-grown trees instead of straggling top-heavy trees; and, second, in the case of trees that are going off in the size and quality of their fruit. Where peaches, apricots, plums, or nectarines are only making very little growth, and that weak, so that the fruit produced thereon is small, it is advisable to head the tree hard back, so that it will throw out some vigorous branches in Spring that will form a new head for the tree. Apples, as well as plums and apricots, are sometimes inclined to over-produce fruit spurs, which become long and straggling, and bear a large quantity of small-size fruit. A vigorous shortening back and cutting out of such spurs will have a very beneficial effect in the quality and size of the fruit produced.

Gather and burn all prunings; and where codlin moth is present in the orchard, examine the tree carefully when pruning it, so as to see if there are any cracks, crevices, or masses of loose bark in or under which the larvæ of the moth may be hibernating. All larvæ so found should be destroyed, and if the work is carried out systematically it will tend to materially decrease the crop of moths that will hatch out the following Spring.

As soon as any part of the orchard is pruned, gather up the prunings and work the land, as a thorough winter weathering of the soil is very beneficial in its effects; and, further, it will tend to destroy many insects that may be wintering in it. The planting of new orchards or of trees to replace any that may have died, or that have been proved to be unsuitable to the district, may be continued during the month, and right on till the end of Winter.

Do not prune vines in the Stanthorpe district, as it is advisable to leave the pruning as late as possible, but vine-pruning can be done at any time now in the Roma or Central districts. Tree-pruning can be continued during the month, and the orchard should be kept well worked. Citrus fruits can be marketed. Lemons should be gathered and cured.

## SUGAR NOTES FROM CAIRNS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon the Cairns district from Mr. D. Macdonald, Field Assistant to the Bureau:—

### HAMBLEDON AND MULGRAVE.

The plant cane is looking well, but ratoons are backward owing to late cutting.

Grubs are doing damage, especially at Greenhills.

In places leaf stripe disease is in evidence, and farmers were advised how to combat it.

Meatworks manure, at the rate of 6 cwt. per acre, is applied by machine—(1) in the seedbed; (1) when cane about 1 ft. high; and (3) on ratoons immediately after ploughing away. Nitrate of soda is used to a lesser extent, and almost entirely confined to ratoons.

Green manuring is observed, but there has been much dissatisfaction amongst growers on account of Mauritius Bean seed failing to germinate. For this reason, growers prefer the pea, but this is almost unobtainable.

The canes chiefly grown are Badila and D. 1135. The latter is drilled 4 ft. 6 in. apart, and Badila 5 ft. The area under D. 1135 is on the increase.

Lime, where used, has proved most beneficial, and at Gordonvale is quoted at 58s. 6d. per ton. On the Mulgrave there is an exceedingly fine crop of Badila, especially on the Munro Estate.

Mr. Bastin's farm is a striking example of what can be done by good methods of husbandry. The area is small and the land not of the best, yet the crops are good, clean, and healthy.

### BABINDA.

The soils are varied in colour and quality, ranging from red volcanic to brown alluvial.

Much of the area now under cane, more particularly that adjacent to the mill, is of a granitic nature. This soil at present produces good

crops, but if cane-growing on these lands is to be a commercial success it will be necessary for growers, as soon as the land is stumped, to go in extensively for green manuring.

The country contiguous to the Russell River is of excellent quality, and the crops thereon are truly magnificent.

As the land is almost entirely virgin, little manuring is done, but in some instances late-cut ratoons have had a dressing of nitrate of soda at the rate of 1 cwt. per acre.

On the older lands grubs are doing some damage.

The varieties grown are Badila and Goru, of which fully 95 per cent. is of the former cane. The average tonnage for last year, when there was 75 per cent. plant cane, was 40 tons per acre.

The cost of putting scrub land under cane varies considerably on account of the nature of the timber and the rains experienced subsequent to falling and prior to burning. The most expensive land to tackle is that timbered with Johnston hardwood, the least expensive being vine scrub.

In addition to clearing, there is the cost of plants, planting, and chipping. From the time of planting until the crop is out of hand, chipping costs amount to about £8 per acre. To facilitate the laying of tramline for harvesting, it is customary to clear strips of land sufficiently wide every 2 chains.

The mill is busily engaged in hauling firewood to meet the needs of the coming crushing. The overhaul of the machinery is proceeding apace, and the season will commence about the 23rd of May. There is plenty of labour offering.

The most persistent weeds are Natal grass and a grass known locally as "Johnstone River grass." The latter grass is particularly troublesome, as it roots from every joint. This grass forms the bulk of the pasturage, and apparently is nutritious and much relished by stock of all classes.

QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## SOURCES OF POTASH.

For the past fifty years the potash supplies of the world have been obtained from Germany. Since the war this source of supply has been closed, but still the demand for it is very great and urgent, and various means have been suggested to obtain at least small quantities from wood and other ashes. It seems strange, however, that, considering the vast area of Australia (2,974,581 square miles), and the great variety of mineral deposits found in all the States of the Commonwealth, no potash yielding deposits have as yet been discovered.

In a Bulletin issued by the Utah Experiment Station, U.S.A., it is stated that "the fact that the German deposits have supplied the world with potassium for more than half a century does not mean that there are no potassium deposits in our country, for such is not the case. We have very large deposits of potash, feldspars, and micas, of leucite, alunite, &c., all containing potassium, but these substances are insoluble in water, and up to the present time the expense attached to converting the potassium contained in most of these substances into an available form has prohibited their use as a source of potassium. Due to the European war the quantity of potassium salts imported into the United States in 1915 was only about one-tenth of that imported in 1915, the last normal year. This has greatly increased the price, and this increased value has given a great impetus to the search for potassium salts in this country."

## ALUNITE AND OTHER MINERAL SOURCES.

Alunite, which is a natural potassium aluminum sulphate, occurs extensively in Colorado, Arizona, Nevada, California, and Utah. At the present time the latter deposit seems to be the largest and best. In its natural state this mineral is insoluble in water, but by gentle heat it is rendered soluble, and after leaching with water the solution is evaporated to dryness and ordinary alum is obtained. At higher and long continued heating sulphur trioxide is evolved and lexivigation of the roasted mass then yields a very pure potassium sulphate. The Mineral Products Company, located at Marysvale, Utah, is turning out daily about one hundred tons of potassium sulphate extracted from this source.

Efforts are being made to discover a process whereby the potassium of leucite may be rendered commercially available. During the last year the brine of a salt lake in Nebraska has yielded a considerable amount of potassium salts. Cave deposits have been located in various places in the West—in Idaho, Utah, and Nevada. In the western part of Millard County, Utah, White Valley, an old alkaline lake bed is located, and efforts are being made to develop this region as a source of potassium. An analysis of a sample taken from the top 18 inches of this bed gave the following results:—" Soluble salts 11·84 per cent.: calcium (Ca) 0·46 per cent.; magnesium (Mg), 0·20 per cent.; carbon dioxide ($CO_2$), 2·10 per cent.; sulphates ($SO_4$), 1·34 per cent.; chlorine (Cl), 5·54 per cent.; potassium (K), 0·99 per cent.; and sodium (Na) (by difference), 1·21 per cent."

The result of other analyses and description of the area are as follows:—" The old lake bed, the receptable for untold ages of the washing and leaching from the potash ledges of the mountains near by, is in dimensions about 3 by 14 miles, and the assays show about 4 per cent. of potash in the clay and water menstruum at a depth of 20 feet. The underground permanent water is struck at about 17 feet, and above this point the potash content is slightly less; indeed, the clear underground menstruum, settled for 24 hours and then filtered, carried ·70 plus per cent. of potash in chemical solution itself. Estimated at 4 or 4½ per cent. with, perhaps, hundreds of feet in depth, there are here many thousands, nay millions, of tons of clay or mud deposit worth 10 dollars per ton in every quarter section, and hundreds of millions of potash in the aggregate deposit, a matter of vast concern as a resource to our State or Commonwealth.

" The material consists essentially of clay, silica, calcium carbonate and magnesium carbonate, together with 6 per cent. of soluble salts (in another report 7 per cent., and in another 4¼ per cent. soluble salts). These latter consist of sodium sulphate, sodium chloride, and potassium sulphate, together with a very small proportion of calcium sulphate, magnesium sulphate, and sodium carbonate."

Salt beds are being exploited in very many localities. It is likely that at some future time the salt deposits of the arid West will compete with Stassfurt in the production of salts of potassium.

The "Agricultural News" of Barbadoes has the following note on the possible new sources of potash:—"The scarcity of potash has stimulated inquiry into the possible new sources of this mineral. One of the latest suggestions is the production of potash salts from olive oil residue (the blackish turbid liquid deposited at the bottom of the sink under oil presses), which contains about 1·5 per cent. or slightly more. It is stated in the "Journal of the Department of Agriculture of Victoria" for October, 1916, that by evaporation and combustion of 100 gallons of this residue, 30 to 35 lb. of ash are recovered. Roughly, 10,000 gallons of this liquid would produce, on the figures given, approximately 1½ tons of ash, the potash content of which would make it worth £2 10s. per ton at the present high price of potash."

We publish the above brief notes on this important subject, in the hope that Australian geologists and chemists will take the matter up, as has been done in New Zealand. If success were to attend their researches, Australia need not depend on Germany for her supplies of potash.

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## SCHOOL OF INSTRUCTION FOR FARMERS' SONS AT GATTON COLLEGE.

Arrangements have been made by the Department of Agriculture and Stock for the holding of a School of Instruction for farmers' sons and young farmers under eighteen years of age from 25th June to 14th July, inclusive. The arrangements with regard to railway fares will be the same as for last year. The total cost of instruction and board will be £3 3s. This is a very reasonable cost, considering that the course includes all the different dairying and farming operations; and we hope to see a good muster of the sons of the backbone of the country—the farmers—take advantage of the good opportunity afforded them of getting valuable instruction and guidance in their future work.

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# MARKET GARDENING.

## MANURE FOR THE VEGETABLE GARDEN.

Amateurs are often troubled about what fertilisers to use and how much. The most simple way out of the difficulty is to buy a good general garden manure, one that contains the three ingredients of phosphoric acid, potash, and nitrogen. Now as to quantity, in the first place we have to remember that ½ lb. to the square yard is 2,400 lb., or over a ton to the acre, which is such a very heavy dressing that it could only be afforded on small areas and with intense cultivation. Still, ½ lb. seems a small quantity to the novice, who wants to give that much to each plant. This is not only not necessary, but is an almost certain way to kill or check the plants. If the beds are in good order, moderate manuring only is required, and if they are not, two or three light dressings are far preferable to one heavy dosing; in fact, it is a standing rule that plants, like weak children and sick people, are injured and

not strengthened by too much and too strong food. Many an amateur, in fact, kills his plants with too much strong manures. "I thought I would have a grand crop of lettuces," said a man recently; "I got fine plants and 1 cwt. of superphosphate, and I put a jam-tinful of super. for each plant, but nearly every one died, and the rest are miserable, stunted things." If he had used a small teaspoonful of the super. for each plant, and mixed this with the soil for 6 inches all round, he would probably have obtained the results he wished, especially if he had watered them once a week, as they grew, with weak extract of cowdung or fowl manure.

It is well to recall the fact that there are 2,240 lb. in a ton, and 4,840 square yards in an acre. Therefore, to apply a pound of manure to a yard is equal to over 2 tons 3 cwt. to the acre. A quarter of a pound to the square yard is over 10 cwt. to the acre, and an ounce to the square yard is over 1½ cwt. to the acre. It may be roughly stated that it will not be wise to go beyond half a pound to the square yard of any artificial manure at one application, and an ounce to the square yard of sulphate of ammonia, nitrate of soda, or potash is as much as anyone ought to use.

It must be remembered that the condition of the manure is a very important consideration in deciding how much may be applied. Thus, bonedust treated with sulphuric acid is bone superphosphate, or the "dissolved bone" of English writers, and the difference is that in the latter case the phosphate of lime is rendered soluble in water and there is free sulphuric acid present. Now, we might apply 10 tons of bonedust to the acre of cabbages without injuring them. We would simply be wasting the bonedust, but if we applied 10 tons of superphosphate our crop would in all probability suffer. So in the case of stable, cow, sheep, or fowl manures. Too heavy dressings of these substances applied fresh are injurious, but if they are thoroughly well rotted and rendered mellow with age, they can be applied in almost any practicable quantities. Then, again, some crops are gross feeders, and will thrive in manure which would kill more delicate plants.

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## PARSNIPS.

Frequently we hear of the failure of parsnip seed to germinate. This may be accounted for by the seed not retaining its vitality long. In the old country two-year-old seed is considered very unreliable. In this country care should be taken only to obtain fresh seed. Again, some amateur gardeners take very little trouble about preparing a seed bed, the necessary deep, fine tilth being neglected. On a rich, sandy soil, it is easy to fulfil the conditions necessary to ensure the germination of the seed. Deep forking prevents curving or "forking." Then, as to manuring: As a rule, no dung should be applied directly to the crop, or "forking" may result. If a soil is poor, 2 cwt. of farmyard manure per square rod (30¼ square yards) dug, or ploughed in, will be advantageous. As parsnips take a long time to grow, the object of manuring

is to supply a sufficiency of fertilising material available for the whole season of growth. A writer in the "Journal of the Board of Agriculture" says that during the working of the land the following artificials should be ploughed or dug in: 4½ lb. of superphosphate and 5½ lb. of basic slag per rod, or an equivalent in the form of a mixture of superphosphate and steamed bone flour, or superphosphate and ground mineral phosphate.

Just before sowing the seed, sulphate of ammonia, at the rate of ¾ lb. per rod, should be worked into the top soil, and after singling, a further dressing of sulphate of ammonia, at the same rate, should be applied between the rows.

Parsnips should be sown early in the season from March to May at the rate of 6 to 7 lb. of seed per acre (1 oz. per rod, or, say, 200 feet of drill), in rows 15 to 18 inches apart, about 1 inch deep and lightly covered. In about a month from sowing, when the plants show the "true" leaf, as well as the "seed" leaf, they should be thinned out to about 6 or 9 inches apart.

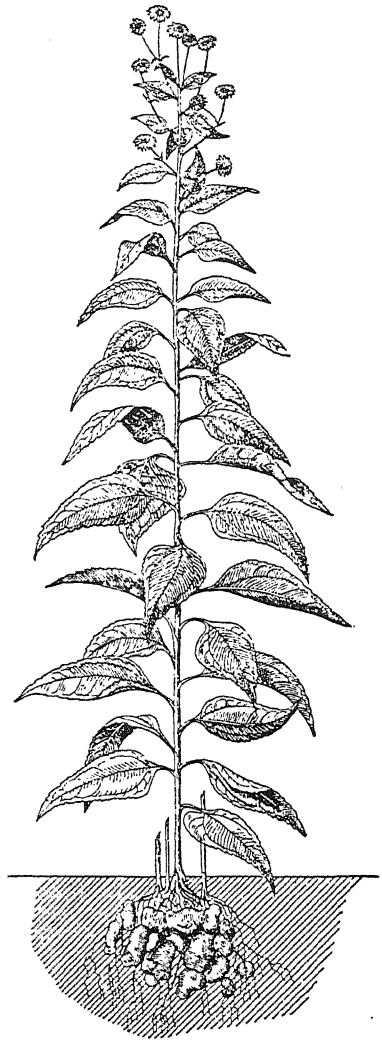
## THE JERUSALEM ARTICHOKE.

Rarely is this excellent, delicate vegetable to be obtained in the markets or in the Brisbane shops. It appears to be little known to or appreciated by market gardeners, and although the tubers are greedily eaten by pigs, greatly to the latter's benefit, pig-breeders, unlike their American brethren, have not yet appreciated the value of this artichoke as pigfood. The only thing remarkable about the plant is its English name. It is not by any means an artichoke. The true artichoke is a chard or thistle, of which the bottoms of the flowers and the riblike sepals are used as food. The botanical name for this true artichoke is *Cynara scolymus*; the so-called Jerusalem artichoke is the *Helianthus tubersus*.



CYNARA SCOLYMUS.

The name of "Jerusalem" is simply a corruption of the word *Girasole*, which the Italians give to both the sunflower and the Jerusalem artichoke. Its original home is North America. The stems, leaves, and flowers bear a great likeness to the Japanese sunflower, and, in fact, is a tuber-bearing sunflower, whose value lies in its tubers, which grow clustered in large numbers around the roots, and resemble knotty English potatoes. The plant grows to a height of 5 or 6 feet. As to soil, it is not at all exacting,



HELIANTHUS TUBEROSUS.

and will do well in almost any soil provided it is not low-lying or ill-drained. In such soil, the tubers will quickly rot away.

It is essentially a drought-resisting plant. The cultivation is extremely simple and does not call for any extra care or skill. All that is needed is that the land be ploughed or dug deeply, and thoroughly

pulverised. The tubers are then planted at a shallow depth 3 feet apart each way, but at 18 inches apart in the rows heavy crops may be obtained. It takes about three or four bags of seed to plant an acre, and the return are considerably superior to those of English potatoes. From 500 to 1,000 bushels per acre have been produced.

The best time to plant is early in the spring or in July and August. The tubers will lie uninjured in the ground until the soil is warm enough to cause them to sprout. In ordinary seasons the crop will be ready for digging in from five to six months. If not required for immediate use, they may be left in the ground and taken up at any time. If dug, they will not keep very long without shrivelling up and becoming soft. In the case of field cultivation on the farm, it is well not to gather more than are required for immediate consumption or for market. Plough two or three furrows across the rows and turn in the pigs. They will gather all they want. There will be quantities of small tubers left in the ground, even after the pigs have been pastured on the field. Consequently, in the early spring a bountiful crop of young plants will spring up. When these plants are a few inches high they should be ploughed out into rows 3½ feet apart, and then thinned out to a stand of one plant to every 18 inches. In this manner the artichokes will always be good, and a good supply of pigfood be obtained.

As a vegetable, boiled, steamed, fried in butter, they are a great delicacy, having an aromatic nutty flavour, and savour something of the asparagus. The tubers are irregularly shaped, being some long (3 inches), others oval or round.

## ANOTHER GOOD WHITEWASH FOR OUTHOUSES.

Mr. A. E. Howling, Taringa, referring to a recipe for whitewash, which appeared in last month's Journal, sends us the following simpler preparation, as given in the "Gardeners' Monthly," which he has used on outside walls facing the east and the west, and finds it stands the weather splendidly:—

Take a half-bushel of lime, put it in a barrel and pour enough boiled water upon it to allow the lime to slack without burning; cover in the steam, and when the lime is dry run it through a medium-sized sieve. Take a bucket half-full of this powder, and pour as much sweet milk upon it as will fill the bucket three-fourths full. Either new or skimmed milk will do, but buttermilk must not be used. To every bucket of this mixture add 1 lb. of silicate of soda (water glass) and stir the whole thoroughly. If too thick, add more milk; if too thin, add the slacked lime until it is of suitable consistency. This can be applied outside or inside on smooth or rough surfaces with almost any kind of brush, and does not require skilled labour in its application. This produces a dull white colour. For a grey or black colour, add lampblack; for reddish-brown or pink, venetian red; Spanish brown gives another shade, and ultramarine any required shade of blue. The wash may be applied to wood, brick, stone, or plaster anywhere. If oil paint has previously been used, the slacked lime should be used with half-whiting.

# Pastoral.

## BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| P. Young .. .. | Talgai West, Ellinthorp | 2 | 42 | Milking Shorthorn Herd Book of Queensland |
| L. H. Paten .. .. | "Jeyendel," Calvert, S. & W. Line | 8 | 21 | Ayrshire Herd Book of Queensland |
| F. C. G. Gratton .. | "Towleston," Kingsthorpe | 2 | 14 | Holstein Cattle Club Herd Book |
| T. Mullen .. .. | "Norwood," Chelmer | 3 | 20 | Queensland Jersey Herd Book |
| J. H. Paten .. .. | Yandina .. .. | 6 | 21 | Ayrshire Herd Book of Queensland |
| Queensland Agricultural College | Gatton .. .. | 2 | 6 | Ayrshire Herd Book of Queensland |
| | | 2 | 3 | Holstein-Friesian Herd Book of Australia |
| | | 3 | 13 | Jersey Herd Book of Queensland |
| J W. Paten .. .. | Wanora, Ipswich .. | 10 | 42 | Ayrshire Herd Book of Queensland |
| M. W. Doyle .. .. | Moggill .. .. | 4 | 12 | Queensland Jersey Herd Book |
| G. A. Buss .. .. | Bundaberg .. .. | 1 | 15 | Herd Book of the Jersey Cattle Society of Queensland |
| W. Rudd .. .. | Christmas Creek, Beaudesert | 2 | 10 | Milking Shorthorn Herd Book of Queensland |
| M. F. and R. C. Ramsay | Talgai, Clifton .. | 5 | 27 | Herd Book of the Jersey Cattle Society of Queensland |
| George Newman .. | Wyreema .. .. | 9 | 37 | Holstein-Friesian Herd Book of Australia |

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| R. Conochie .. .. | Brooklands, Tingoora | 9 | 21 | Queensland Jersey Herd Book |
| W. J. Barnes .. .. | Cedar Grove .. | 10 | 37 | Queensland Jersey Herd Book |
| T. B. Murray-Prior .. | Maroon, Boonah .. | 2 | 37 | Queensland Shorthorn and Australian Herd Books |
| W. J. Affleck .. .. | Grasmere, N. Pine .. | 6 | 31 | Queensland Jersey Herd Book |
| A. J. McConnel .. | Dugandan, Boonah | 19 | 36 | Australian Hereford Herd Book |
| A. Pickels .. .. | Blackland's Stud Farm, Wondai | 4 | 62 | Illawarra Dairy Cattle Herd Book of Queensland |
| G. C. Clark .. .. | East Talgai, Ellinthorp | 3 | 7 | New Zealand Herd Book |
| H. D. B. Cox .. .. | Sydney (entered brother's name) | 3 | 16 | Commonwealth Standard Jersey Herd Book |
| J. T. Perrett and Son | Coolabunia .. .. | 2 | 36 | Illawarra Herd Book of Queensland |
| State Farm .. .. | Kairi .. .. | 4 | 8 | Ayrshire Herd Book of Queensland |
| | | 1 | 2 | Holstein-Frisian Herd Book of Australia |
| E. M. Lumley Hill .. | Bellevue House, Bellevue | 45 | 127 | Australian Hereford Herd Book |
| W. F. Savage .. .. | Ramsay .. .. | 1 | 12 | Illawarra Herd Book of Queensland |
| Tindal and Son .. | Gunyan, Inglewood | 50 | 400 | Australian Hereford Herd Book |
| J. N. Waugh and Son | Prairie Lawn, Nobby | 3 | 28 | Queensland Jersey Herd Book |
| J. H. Fairfax .. .. | Marinya, Cambooya (2) | 9 | 55 | Ayrshire Herd Book of Queensland |
| C. E. McDougall .. | Lyndhurst Stud, Warwick (2) | 25 | 100 | Queensland Shorthorn Herd Book |
| J. Holmes .. .. | "Longlands," Pittsworth | 6 | 20 | Ayrshire Herd Book of Queensland |
| P. Biddles .. .. | Home Park, Netherby | 1 | 20 | Illawarra Dairy Cattle Association |
| A. Rodgers .. .. | Torran's Vale, Lanefield | 1 | 9 | Milking Shorthorn Herd Book |
| R. S. Alexander .. | Glenlomond Farm, Coolumboola | 1 | .. | Holstein-Frisian Herd Book of Queensland |
| State Farm .. .. | Warren .. .. | 3 | 83 | Ayrshire Herd Book of Queensland |
| S. H. Hosking .. .. | Toogooloowah .. | 2 | 15 | Holstein Cattle Club Herd Book |

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, APRIL, 1917.

The fourteenth egg-laying competition held at the Queensland Agricultural College commenced on 3rd April. The total number of eggs laid during the twenty-eight days was 3,239. Mr. E. Chester's white leghorns win the monthly prize in the light breeds with 118 eggs, while the black orpingtons owned by Mr. A. E. Walters score in the heavy section. The following are the individual scores:—

| Competitors. | Breed. | April. |
|---|---|---|
| LIGHT BREEDS. | | |
| J. Chester, Logan road, South Brisbane ... ... | White Leghorns ... | 118 |
| *J. R. Wilson, Eudlo ... ... ... ... | Do. ... ... | 108 |
| W. R. Crust, Alderley P.O. ... ... | Do. ... ... | 104 |
| G. Chester, St. George street, Woolloongabba ... | Do. ... ... | 104 |
| A. H. Padman, 47, Pirie street, Adelaide, S.A. ... | Do. ... ... | 97 |
| W. Becker, Bridge street, Toowoomba ... .. | Do. ... ... | 91 |
| T. B. Hawkins, Redbank .. ... .. | Do. ... ... | 86 |
| T. Taylor, Thompson Estate, South Brisbane ... | Do. ... ... | 79 |
| E. Cross, Harlin road, Ipswich ... ... ... | Do. ... .. | 76 |
| R. Holmes, Harlaxton, Toowoomba ... ... | Do. ... ... | 76 |
| *A. W. Bailey, Arthur terrace, Red Hill ... | Do. ... ... | 75 |
| Oaklands Poultry Farm, Banyo ... ... ... | Do. ... ... | 75 |
| *G. H. Turner, Aratula ... ... .. | Do. ... .. | 73 |
| Chris Porter, Monture Estate, Wondai... ... | Do. ... .. | 72 |
| *J. Zahl, Boonah .. ... ... ... | Do. ... ... | 72 |
| Mars Poultry Farm, Sunnybank ... ... .. | Do. ... ... | 69 |
| D. Fulton, E. Park Estate, East Brisbane ... | Do. ... ... | 68 |
| Mrs. W. D. Bradburne, Kogarah, N.S.W. .. | Do. ... ... | 67 |
| Mrs. S. J. Sear, Highgate Hill, South Brisbane | Do. ... ... | 65 |
| T. A. Pettigrove, Northcote, Victoria ... ... | Do. ... ... | 64 |
| J. G. Richter, Aratula ... ... ... .. | Do. ... ... | 63 |
| A. Schillig, Maryborough .. ... ... ... | Do. ... ... | 60 |
| Mrs. J Carruthers, Booval ... ... ... | Do. ... ... | 59 |
| C. H Singer, Taringa ... ... ... ... | Do. ... .. | 59 |
| Geo. Williams, Boundary street, Ipswich ... | Do. ... ... | 58 |
| *T. Fanning, Ashgrove ... ... .. .. | Do. ... ... | 57 |
| W. Thomas, 15-mile Siding, South Coast Line ... | Do. ... ... | 54 |
| *A. T. Coomber, Bundaberg ... ... ... | Do. ... ... | 50 |
| F. W. Leney, Warwick ... ... | Do. ... .. | 44 |
| *C. Knoblauch, Hawthorne street, South Brisbane | Do. ... ... | 44 |
| F. Clayton, Blacktown, N.S.W. ... ... | Do. ... ... | 38 |
| L. G. Innes, Kennedy terrace, South Brisbane ... | Do. ... ... | 37 |
| C. P. Buchanan, 258-260, Queen street, Brisbane | Do. ... ... | 32 |
| J. L. Newton, Doctor's Creek, Haden ... ... | Do. ... .. | 30 |
| *Mrs. J. R. D. Munro, Warwick .. ... ... | Do. .. ... | 30 |
| E. A Smith, Paddington, Brisbane ... ... | Do. ... ... | 23 |
| J. Holmes, Frederick street, Toowoomba ... | Do. ... ... | 19 |
| Kelvin Poultry Farm, Scott road, Kelvin Grove | Do. ... ... | 17 |
| Moritz Bros., Kalangadoo, S.A. ... ... ... | Do. ... ... | 16 |
| S. C. Chapman, Murphy's Creek ... ... ... | Brown Leghorns ... | 16 |

## EGG-LAYING COMPETITION—*continued.*

| Competitors. | Breed. | April. |
|---|---|---|
| **LIGHT BREEDS—*continued.*** | | |
| Miss M. Hinze, Milton road, Milton ... ... | White Leghorns ... | 13 |
| *Dixie Egg Plant, Newmarket, Brisbane ... | Do. ... ... | 12 |
| *Dr. E. C. Jennings, Ipswich .. ... ... | Do. ... ... | 12 |
| J. Ferguson, Logan road, South Brisbane ... | Do. ... ... | 9 |
| G. J. White, Haden ... .. ... | Do. ... ... | 6 |
| *J. M. Manson, Milton road, Milton ... ... | Do. ... ... | 5 |
| *C. C. Dennis, Kelvin Grove, Brisbane ... ... | Do. ... ... | 1 |
| *A. E. Walters, West End, South Brisbane ... | Do. ... ... | 0 |
| G. Howard, Mount Morgan ... ... ... | Do. ... ... | 0 |
| **HEAVY BREEDS.** | | |
| A. E. Walters, West End, South Brisbane ... | Black Orpingtons ... | 81 |
| W. Smith, Grove Estate, Brisbane ... ... | Do. .. ... | 80 |
| F. A. Claussen, Wattle street, Hendra ... ... | Rhode Island Reds ... | 76 |
| *R. Burns, Sladevale, *via* Warwick .. ... | Black Orpingtons ... | 76 |
| H. Jobling, Cessnock, N.S.W. ... ... | Do. ... ... | 74 |
| D. Kenway, West Pennant Hills, N.S.W. ... | Do. ... ... | 64 |
| *Mars Poultry Farm, Sunnybank ... ... | Do. ... ... | 54 |
| Cowan Bros., Burwood, N.S.W. .. .. ... | Do. ... .. | 40 |
| W. S. Hanson, Lake Macquarie, N.S.W. ... | Do. ... ... | 39 |
| P. C. McDonnell, Beecroft, N.S.W. ... ... | Do. ... ... | 38 |
| Mrs. Jobling, Plattsburg, N.S.W. ... ... | Do. ... ... | 26 |
| *G. W. Holland, Paddington, Brisbane ... ... | Do. ... .. | 25 |
| F. Clayton, Blacktown, N.S.W. ... ... ... | Rhode Island Reds ... | 14 |
| E. Morris, Paddington, Brisbane ... ... ... | Black Orpingtons .. | 13 |
| C. B. Bertelmeier, Kensington, S.A. ... ... | Do. ... ... | 11 |
| *F. W. Leney, Warwick .. ... ... ... | Rhode Island Reds ... | 10 |
| *Kelvin Poultry Farm, Kelvin Grove, Brisbane... | Plymouth Rocks ... | 8 |
| King and Watson, St. Mary's, N.S.W. ... ... | Black Orpingtons ... | 6 |
| *E. A. Smith, Paddington, Brisbane ... ... | Do. ... ... | 1 |
| R. Burns, Sladevale, Warwick ... ... | S.L. Wyandottes ... | 0 |
| *Miss M. Hinze, Milton road, Milton ... ... | Black Orpingtons .. | 0 |
| C. C. Dennis, Kelvin Grove, Brisbane ... ... | White Wyandottes ... | 0 |
| *E. F. Dennis, Kelvin Grove, Brisbane ... ... | Black Orpingtons ... | 0 |
| Total ... ... ... ... ... | ... | 3,239 |

* Indicates that the pen is engaged in the single hen test.

## RESULTS OF SINGLE HEN TEST.

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| J. R. Wilson ... ... ... | 20 | 15 | 18 | 19 | 21 | 15 | 108 |
| A. W. Bailey ... ... ... | 17 | 7 | 12 | 13 | 10 | 16 | 75 |
| G. H. Turner ... ... ... | 0 | 18 | 16 | 14 | 10 | 15 | 73 |
| J. Zahl ... ... ... ... | 16 | 10 | 20 | 3 | 15 | 8 | 72 |
| T. Fanning ... ... ... | 6 | 10 | 7 | 13 | 4 | 17 | 57 |
| A. T. Coomber ... ... ... | 9 | 4 | 17 | 8 | 2 | 10 | 50 |
| Mrs. Munro ... ... ... | 19 | 5 | 5 | 0 | 0 | 1 | 30 |
| Dixie Egg Plant ... ... ... | 2 | 0 | 0 | 10 | 0 | 0 | 12 |
| Dr. Jennings ... ... ... | 0 | 0 | 1 | 1 | 9 | 1 | 12 |
| J. M. Manson ... ... ... | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| C. C. Dennis ... ... ... | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| A. E. Walters ... ... ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

RESULTS OF SINGLE HEN TEST—*continued.*

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| HEAVY BREEDS. | | | | | | | |
| R. Burns ... ... ... ... | 9 | 0 | 19 | 0 | 22 | 26 | 76 |
| Mars Poultry Farm ... ... | 9 | 16 | 4 | 20 | 4 | 1 | 54 |
| G. W. Holland ... ... ... | 8 | 0 | 0 | 0 | 17 | 0 | 25 |
| F. W. Leney ... ... ... | 0 | 0 | 0 | 0 | 9 | 1 | 10 |
| Kelvin Poultry Farm ... ... | 0 | 0 | 0 | 8 | 0 | 0 | 8 |
| E. A. Smith ... ... ... | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Miss M. Hinze ... ... ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| E. F. Dennis ... ... ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## INCUBATORS AND THEIR MANAGEMENT.

By J. BEARD, Instructor in the Poultry Industry, Queensland.

In April last Mr. J. Beard, at Toowoomba, gave the following advice to poultry breeders concerning incubators. He said:—"In choosing an incubator be sure you get a machine of sufficient capacity to meet your requirements. It is much better to be obliged to set 50 eggs into a machine of 100-egg capacity than to have 100 eggs you want to hatch put into a machine of 50-egg capacity. In deciding what incubator to buy, try to get the fair and unbiased opinion of a man who is a successful incubator operator. Find out what kind of machines other successful breeders use. Study carefully the testimonials of people who have successfully used the machine. If you do this and are guided by your own best judgment, you cannot go wrong. When you receive your incubator, study carefully the printed instructions which come with it. Before you start the machine be sure that you have mastered the instructions and that you know thoroughly what the manufacturers consider best as to method of running and location of machine. The most important things to consider in selecting the location of machines are, freedom from excessive vibration, and freedom from coal gas or decaying vegetable matter and a solid level floor on which to set the machine. It is very important that the body of the incubator be level, otherwise the egg chambers will not heat evenly. After studying your instructions carefully and setting the machine in a well ventilated place, but not in the draft, run it empty for a day or so until you have it adjusted so as to maintain an even temperature of 102 or 103 degrees in the egg chambers. After you understand the operation of the machine and can maintain the desired temperature in the empty incubator, the eggs may be put in.

"Beginning on the second day, the eggs may be turned twice daily. These turnings should be as nearly twelve hours apart as possible. The trays should be turned from end to end each time you turn or cool the eggs. The time to allow for cooling the eggs should be five minutes on the first day, increasing the time as the hatch progresses towards the latter end of the hatch, and if mild weather prevails, thirty minutes would not harm the hatch. Eggs should be tested twice during the hatch, the first test being made on from the sixth to the tenth day, the second test on the fourteenth or eighteenth day. At the first test, remove from the tray all infertile eggs and dead germs. Mark those which are doubtful and let them remain in the machine until the second test. If they do not develop before that time, they should be removed, as well as all other dead germs. Stop turning the eggs as soon as the chicks begin to break the shells. Push the tray back as far as it will go, or if there are two trays, push one back and the other forward, leaving a space for the chicks to fall into the nursery below. Close the machine and let it alone until the hatch is over. If it has been regulated properly, it is perfectly safe to leave it, and it will do no harm if the temperature runs to 105 degrees when the chicks are hatching, but it should not go higher. When all the chicks have hatched, the ventilator should be thrown wide open, egg trays and shells removed from the machine, and the door left open a little, about one-eighth of an inch. Allow the chick to remain in the machine from 24 to 36 hours after hatching, then remove to the brooder, which should be running perfectly if artificial heat is used, before they are placed in it.

## NATURAL INCUBATION.

"I prefer the nest in the ground filled up at the bottom with a little loose, moist loam. Pack the earth into the corners of the nest, and dish out the centre to make the nest a shallow concave, but do not dish out too much as the eggs are liable to roll to the centre and be broken by the hen. The corners of the nest should be just sufficient to keep the eggs from rolling out from under the hen. On the moist earth scatter a little tobacco dust or some tobacco stems, then add a thin layer of soft hay, not straw. Always set more than one hen at the one time, and at the end of seven days test out the infertile eggs under each hen. Say, if you had three hens sitting at the same time and the fertility should run low, you would be able to put the whole of the fertile eggs under two hens and start off again with the other. If you have two hens coming off at the same time, and the weather is favourable, you could run the two clutches together and reset the other hen along with the other, and after your next test you would be able to spell the one that had brought off the previous clutch of chicks.

## CHICKS

require no food for the first thirty-six hours, but must be provided with fine sand to scratch about in. The first meal to be given should consist of coarse oatmeal or rolled oats for a couple of days, then add specially

prepared chick food, which can be bought at most of the large stores in your town from the agents in Brisbane. After a couple of weeks, should you find this feed too expensive, you could wean them off on to crumbly mash. By this method they cannot select certain seeds in particles which they prefer, and waste the remainder as they will in dry feed. No matter how accurately we figure out our dry feed return, we cannot force them to eat the less palatable after they have filled up on the choice grain. Second, because a soft properly compounded food needs no accessories except green food, which is imperative in either case, and it saves much energy which would be expended by the chicks in grinding it. Bear in mind, we are raising these chicks for profit, not pets. We must therefore force them, to the limit of their ability, to eat, digest, assimilate, and grow. Above all things, never give your chickens hard boiled eggs for the first start off. This has already been supplied by the absorbed yolk before leaving the shell.

### TIME FOR HATCHING.

"Hatch all your heavy breeds in July and August, light breeds in August and September. By adopting this principle you will avoid the warts or chicken-pox and other diseases that chickens are subject to.

### FOR AUTUMN HATCHING.

"I would advise March only as the month to hatch in. If you go later, then the cold weather is on top of you and retards the growth of the chicks.

### FOR BROODERS.

"I prefer the lampless ones to the ones artificially heated, especially for a mild climate like Queensland.

### FEED FOR EGG PRODUCTION.

"Best results are obtained by feeding moist mash in the morning and grain in the evenings, with green stuff of some kind at midday. No set rule can be observed as regards the quantity of the constituents of the mash, as bran and pollard vary so much in quality. If the meals are of fair average quality, the usual proportion is one of the former and two of the latter, with 30 per cent. of finely chopped green stuff. If lucerne chaff is used it should be steamed overnight in a wooden cask. To this should be added a small handful of salt in proportion of, say, 1½ lb. to every 100 lb. of mash. Take care to use boiling water, as it greatly improves the chaff. Close the cask well with bags, so that the heat will be retained, and it will make a better mash and much easier to mix. Give oilcake, 2 lb. for each 100 birds, every second morning, and meat about 1 oz. per bird, each morning the oilcake is not

used. The oilcake and meat should be soaked in boiling water over night. Mix in a big tub or trough. Put the green food in first, then bran and oilcake, and finish off with pollard and mix into a crumbly mass. The birds should be given as much as they will eat. The best plan is to go round a second time, and if they require more, give it to them. After a couple of weeks you will learn just what quantity they require. The food is given in a clean wooden trough with flat bottom, judging the size by what number of fowls you have in the pen, and about half an hour after feeding go round the pens and remove any food that may be left. During the cold weather and while the birds are moulting, meat and oilcake may be given every day as it will help to brace them up.

"It is not wise to give them too much during hot weather. Green food of some kinds should be given at midday. If none is available, soaked lucerne chaff, dried off with a little bran and pollard, is greatly relished by the fowls. Wheat should be the principal food in the evenings, but to change every few days to oats and cracked maize will be greatly relished by the birds, and will keep them in good health. No set rule can be given in feeding grain, as some birds eat fully twice as much as others, but they should have as much as they can eat. If you see grain lying about the pens, reduce the supply.

## FEEDING STOCK BIRDS.

"Here a moderate supply of eggs is required as they are for hatching purposes and are wanted to produce strong hardy healthy chicks with sound constitutions. For these reasons discontinue the regular morning mash, and only give it by way of a change one or two mornings a week. The food, therefore, will be mostly grain. Take care, however, that the birds are not fed too often on the one kind of grain, and it will be quickly noticed which kind they prefer. Breeding birds must be supplied with plenty of green stuff, and they will produce strong, fertile eggs. No food of any kind should be left in the pen. Have the birds ever on the move. If the soil is of any other nature than sandy, you must provide scratchings for the birds.

## EGGS FOR EXPORT.

"I feel certain that at the present time it is of little use considering this question at all until such times that we have a very large surplus to handle, and a surplus that will have the appearance of lasting for a definite period. It would be useless to think of at the present time, considering the ruling price of eggs for the last two years in Brisbane. The average for 1915 for extra special was 1s. 3½d. per dozen; 1916, 1s. 5½d. per dozen. With these prices ruling, export is almost, if not quite, out of the question."

# The Orchard.

## ORIGIN OF THE NAVEL ORANGE.

The following notes on the Navel Orange will doubtless be of interest to some of our correspondents who, of late, have been seeking information concerning this variety of the Citrus family. They appeared in the issue of the "Agricultural News" of Barbados for 27th January, 1917:—

### ORIGIN OF THE NAVEL ORANGE.

In 1913-14, an agricultural expedition to Southern Brazil was organised by the United States Department of Agriculture, to collect all available information concerning the navel orange, particularly at Bahia, from which point the parent Washington navel trees were sent to the United States. The observations and conclusions of the expedition (briefly referred to in the "Agricultural News" for 4th November, 1916), which should not be without interest to persons concerned with citrus cultivation in the West Indies, are summarised in the "Monthly Bulletin," California State Commission of Horticulture, as follows:—

All available evidence proves that the navel orange of Bahia originated about 1820 as a bud sport from the *selecta* variety, and was first propagated by a Portuguese, the first man to use this method of plant propagation in Brazil.

The Washington navel orange was introduced into the United States by the United States Department of Agriculture in 1870 from Bahia, Brazil. The first trees sent to California by the department were planted on the L. C. Tibbets ranch at Riverside about 1875, and these two trees are still living, the property of the city.

The navel orange groves of trees of our west and of several foreign countries are directly descended from the Tibbets trees. The great commercial success of the navel orange industry in California is the foundation upon which the successful citrus industry of this State as a whole has been built.

The oldest navel orange trees found in Brazil were more than forty years of age. They are now producing the largest and best crops of any trees found in that district.

The method of tree renewal for treating diseased trees in Bahia is a success. The replacing of diseased trees by growing a new top is universally practised in that region.

The use of manure in maintaining the citrus trees in productive condition, and improving the quality of the fruit is an established and successful practice. The liberal use of manure is considered to be absolutely essential to profitable citrus production. The average annual production is about 100 navel oranges per tree.

Scale and other insect enemies of the citrus are evidently controlled by natural parasites.

The Bahian navel fruits are very different in appearance, quality, and other commercial characteristics from Californian fruit. For this reason we may safely conclude that no one can foretell exactly the behaviour of plants under new environmental conditions. Consequently all food-plants introduced should have a wide and careful trial, and in our opinion all foreign food-plants should be tried without too fixed ideas as to their probable behaviour in any particular region.

The shipment of bud wood or trees from Brazil is attended with both difficulty and danger. Great care must be used in packing and condition of storage and shipment in order to preserve the buds in living condition. The bud wood should be inspected with the greatest possible care in Brazil and in the United States in order to prevent the introduction of insect enemies, fungoid disease or other parasitic pests.

The discovery of the Bahia navel orange by a traveller in Brazil is a good illustration of the importance of careful observation of food-plants in foreign countries by all travellers. All information about new food-plants found in this way is likely to prove of value. Through the Office of Seed and Plant Introduction of the United States Department of Agriculture, such information can be followed up, and if desirable, supplies of bud wood or seed be obtained for trial in this country.

We found a total of about 76,000 navel orange trees near Bahia. The orchards are located on hilltops or hillsides. The orange growers are prosperous and an effort is being made by the local government to extend the culture of this variety.

A permanent cover crop of Para grass in connection with the liberal use of cow manure was the most successful method of culture observed, under the conditions of an average annual rainfall of about 50 inches.

Citrus bud sports are common in the orchards observed. The origin of the navel orange from this cause is proof of the importance of this condition in the improvement of citrus fruits.

# Horticulture.

## STRAWBERRY CULTURE.

### LOCATION AND SOILS.

Hill lands are less liable to frosts than lowlands, but level land is especially desirable where irrigation can be practised. With regard to soil, it appears that in Europe and the United States of America, clay loams are more productive than sandy loams, whereas in Australia the largest crops are raised on rich, light, or sandy loams. The strawberry thrives best in a cool or temperate climate, such as is found in Southern Queensland on the Blackall Range, and on the coast lands, as at Wellington Point, Redland Bay, and other places on the sea-coast. Newly cleared forest and scrub soils give better results than old soils. Strawberries are not an exhausting crop on the land. Nevertheless, on account of the rapid growth of the plant, they require an abundance of fertilisers.

### MANURES.

Well-rotted farmyard manure is one of the very best fertilisers for strawberries, as stated by Mr. W. French, Wellington Point. Unfortunately, this class of manure is now very scarce, and the same authority recommends the use of bonedust at the rate of 10 cwt. to the acre in field cultivation. By putting this well down below the surface, it greatly encourages the roots to strike downwards, and the lower they get down, the more moisture they obtain, and are thus not affected by heat or drought half so much as when the roots are encouraged close to the surface. After the first crop is gathered a fertiliser consisting of superphosphate, sulphate of potash, and sulphate of ammonia is used in the following proportions:—Two parts superphosphate, 2 parts sulphate of potash, and 1 part sulphate of ammonia. This mixture is sown in a furrow about 2 inches deep run along the rows by a small hand plough, and is covered by running the plough the reverse way. In the present scarcity of potash, wood ashes at the rate of 50 to 100 bushels per acre should be applied in field culture. The fertiliser should be profitably supplemented by two or three top-dressings of nitrate of soda, each at the rate of 1 cwt. per acre when the first fruit is forming, and, thereafter, at intervals of about two weeks, or the nitrate of soda could be applied at frequent intervals dissolved in water.

### PLANTING IN THE FIELD.

Draw out drills with the plough as deep as possible, 2 feet 6 inches apart, and put the manure in the trench. If artificial manure is used, draw a long-toothed rake along the furrow to mix the soil and manure thoroughly. In a fortnight, it will be ready for planting. Plant four rows in a bed. By having narrow beds, trampling upon the planted soil

is avoided. Set the plants about 1 ft. apart in the rows. Planting close in the garden necessitates replanting every year, whereas, in field culture, more room is given.

### PLANTING THE STRAWBERRY.

"While it is impossible," says Mr. French, "to fix a hard-and-fast time to transplant, as the seasons differ so much, I shall have to leave it to the grower's own judgment. If the ground is in good order, and the weather showery, start about the 1st of March, and, as a preference, with young runners. Some growers say they get the best results from old crowns split up, but that is not my experience. I plant about 2 feet 6 inches between the rows and from 1 foot to 18 inches in the rows, to allow the horse and scuffler room to work, so as to keep the soil always open, a matter of great importance. In transplanting, some recommend shortening the roots by one-half. This practice is all right in the cooler countries, where the ground is, practically speaking, always moist and cold below. It is also a good practice, in cases where the roots are allowed to get dry, or are injured in any way. In such cases, a clean cut would be beneficial. When planting, I allow the roots to hang down straight in the hole, the deeper the better, on account of coolness and moisture, provided the crown is not smothered."

### SMALL GARDEN CULTURE.

Trench the beds 5 feet wide and 18 inches deep. If the subsoil is of a clayey nature, leave it at the bottom of the trench, but, if fairly good, mix it with the top spit along with plenty of vegetable matter, rubbish, &c. Let it lie for a month or more to mellow. Then fork and pulverise well until the soil is free from lumps. Now let it rest for a week or two. If farmyard manure is procurable, scatter it on the surface 2 or 3 inches thick, and fork it in well so as to mix the soil and manure thoroughly. In a fortnight it will be ready for planting. Plant four rows in a bed, and set the plants about a foot apart. Planting close in the garden necessitates, as above stated, replanting every year, although several varieties can stand for two years, giving good results by keeping the soil between the rows constantly cultivated.

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## QUEENSLAND AGRICULTURAL JOURNAL.

Journals for February, 1916, have been received during the month of May from—

C. Ashton, Mundubbera.
H. Beelley, Sunnyside, Springsure.
H. J. Hobbs, Aspley.
W. J. Rolfe, Gargett.
Anonymous.

As the requirements for this issue of the Journal have been sufficient, we thank our subscribers for their prompt response to our request.

# Viticulture.

## THE SUMMER BUD OR "YEMA" GRAFT OF THE VINE—No. 2.

### THE GRAFT IN VICTORIA.

From the description first reproduced above,* and acting on verbal advice, several Rutherglen growers tried the graft. Mr. P. A. Wyatt, at that time Travelling Viticultural Assistant of this Department, demonstrated it to numerous growers, with the result that a good many vines were thus grafted in February, 1909. The encouraging results of these first trials led to their renewal on an increasing scale each season with greater success. As was to be expected, each grafter applied such modifications and improvements as practical experience suggested to him, until a method was evolved, differing somewhat from either of those already described, and which is now very generally followed throughout the district.

Simultaneously with this the graft was being extensively practised at Mildura, with most encouraging results. To Mr. J. Rounce, now an officer of the New South Wales Agricultural Department, belongs the credit of its success in this district. He had experience of this graft in England before coming to Australia, as he informed the writer after a lecture delivered in 1908, at which the graft, as practised in Spain, was described and illustrated. He had seen it applied to roses and several other garden plants. Mr. Rounce practised it on the vine with remarkably successful results, and within the past few years he has reconstituted considerable areas on resistant stock by this method. The manner in which he executes the graft differs a good deal from that which has become so popular at Rutherglen, as will be seen presently.

The "Yema" graft is, in fact, remarkably elastic; it permits of a good deal of variation, according to the individual fancy of the grafter. The two methods about to be described and figured do not pretend to exhaust all the possibilities. The graft may yet be varied in other details.

As to which is the better of the two, it would be rash to attempt a definite statement. The writer has known percentages of 98 and 99 of completely successful unions by both methods. Both methods seem to give equally perfect unions. So far as the final result, there would seem to be little difference between the two, though Mr. Rounce's modification, permitting, as will be seen, the suppression of tying or binding the graft, should enable the grafter to operate more rapidly. These two typical modes of executing the graft will now be described in detail. Afterwards, a few points of importance in connection with summer grafts in general, irrespective of the style of graft, will be considered.

* *See* "Queensland Agricultural Journal" for May, 1917.

## THE RUTHERGLEN METHOD.

This is illustrated in Fig. 5, which shows how the scion-bud is removed from the cane, and Fig. 6, where the preparation of the stock, the fitting in of the scion-bud, and the binding necessary to hold it in position, until knitted, are shown.

A suitable bud must first be selected. It should be situated on a cane of somewhat smaller diameter than the stock on which it is to be grafted. It must also fulfil the conditions specified under the heading "scion requirements." The scion-bud is removed, as shown in Fig. 5. An oblique cut, penetrating to about the middle of the cane, and rather more than half an inch below the bud, is first made (*a*, Fig. 5). Commencing at *b*, a curved cut is then made as shown by the dotted line (Fig. 5), which, junctioning with the first cut, removes the scion-bud. This cut should be fairly deep, so that, after removal, the piece bearing the bud shows the pith along the whole section. It is now rather thicker than is desirable, and requires paring down on the inner, or wood side, and shortening by the cut shown at *c* (Fig. 5), which is made at a more acute angle with the axis of the cane than that at *a*. The paring should be carefully done, so that the bud-scion, when finished, is cut to an absolutely plane surface, only showing two small spots of pith on the inner or wood side, above and below the transverse woody partition, which is to be found at every bud. The section should appear as shown (Fig. 5), C.

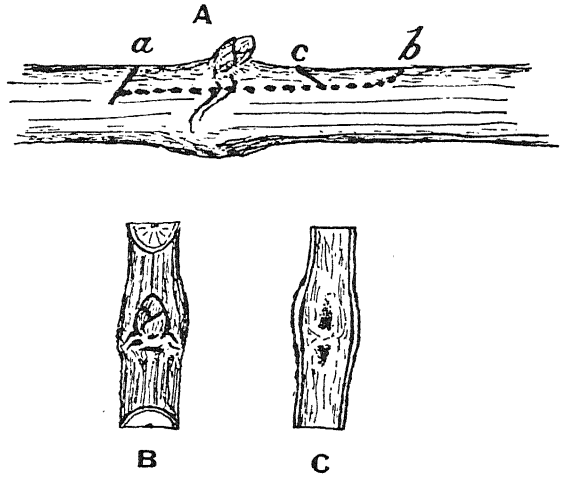



FIG. 5.

A, removal of scion-bud as practised at Rutherglen; B, outer view of bud immediately after removal; C, view of same from inner (wood) side, after trimming and when ready for insertion in stock.

Fig. 6 shows how the stock is prepared. Four cuts of the budding knife are required; A shows the stock after the first two have been executed, and B after the completion of the whole four. The stock is now ready to receive the scion.

The first cut should be exactly similar to that made at *a* (Fig. 5), when taking the scion. It is essential for an accurate fit that this cut

should be made at the same angle, both on stock and scion; a way of insuring this is by cutting the scion, in the first place, a little longer (below the bud) than is really required. By holding it against the uncut stock in as nearly as possible the position it will ultimately occupy, it is easy, by a single cut of the budding knife, through the base of the scion-bud, and into the stock to the required depth, to obtain absolute identity of angle.

The remaining three cuts will be readily understood on reference to B (Fig. 6). It will be noted that cut No. 4 is continued for about a third of an inch, after junctioning with No. 3, so as to provide a sort of flap, under which the sharply bevelled apex or toe of the scion can be pushed whilst the heel is made to fit neatly in the niche or cavity prepared for it. The scion-bud, definitely placed in position, is shown in C (Fig. 6). A fifth cut can usually be made with advantage at *c* (Fig. 6), slightly shortening the flap which covers the toe of the scion-bud. This very small cut is made obliquely, but in reverse sense to that which completed the scion-bud *c* (Fig.5), and in such a way that the section of the cambium layer which it exposes is as near as possible to that made by the

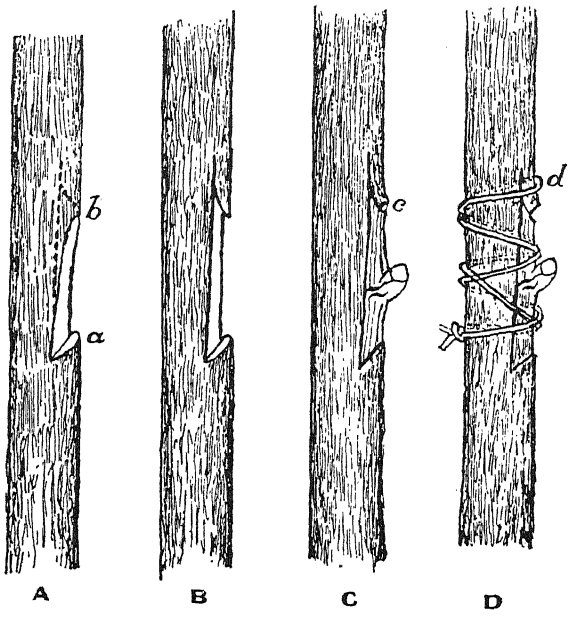



FIG. 6.—THE RUTHERGLEN METHOD.
A and B shows the four cuts which prepare the incision in the stock; C, scion bud placed in position; D, method of tying.

third cut in the lifting of the scion *c* (Fig. 5). Though these two cambium sections are not in absolute contact (as all the others should be), only a very small interval separates them. They are close enough for this small gap to be easily bridged over by callus, the formation of which is remarkably active under the very suitable conditions of warmth, moisture, and aeration prevailing in the interior of the mound.

The scion-bud should be of such a size that the cambium sections of stock and scion coincide in the greatest measure possible. The more completely this condition is realised, the better the chance of the graft taking. On no account should the scion be too large—overlapping is fatal to success, the rapid formation of callus tending to lift the scion-bud out of its proper position. If any departure from an accurate fit is permissible, the scion should be too small rather than too large; callus then forms outside and not inside the graft, holding the bud in, instead of forcing it out. An exact fit, however, is the ideal which should be aimed at. Another reason for avoiding too large a bud is that there is a tendency for the scion to be slightly flattened out by the pressure of the string used in tying; this may cause one, or even both sides of a large bud to overlap, with the undesirable result just described.

In a trellised vineyard, the bud should be placed in the direction of the wire, and not perpendicularly to it, which would result in the young vine growing out of the line the following spring. The bud should also be placed, as far as is possible, on the lee side of the stock as regards winds likely to cause damage in spring.

The graft having been properly fitted, it must be tied, so that stock and scion will be held firmly in position until knitted. Tying is indispensable in the case of the Rutherglen form of graft, with its rather long and thin scion-bud. Tying may be done in various ways—that shown at D (Fig. 6), is perhaps the most convenient. Bagging twine, preferably split up, so that two or three strands are used, instead of the whole twine, is a convenient tie. It is better than raffia, which, being flat, interferes rather more with callus formation. A common mistake with beginners is to plaster the graft with raffia, string, or other substances. The tie is really only needed to keep cut surfaces in contact until knitted—otherwise it hinders rather than promotes the formation of callus. Protection by waxing, &c., is no doubt necessary in the case of an apple, which is grafted above ground; not so with the vine, which is usually grafted underground. The mound of loose earth (Fig. 3) provides ample protection against drying out of the scion.

Opinions differ somewhat as to the best length to give the scion-bud —that shown in Figs. 5 and 6 is the most usual. Some experienced grafters favour a lesser length, their advice being to make the graft as short as is conveniently practicable.

## MR. ROUNCE'S MODIFICATION.

This method, which has been so successful in the Mildura district, will be readily understood on reference to Fig. 7. The scion-bud is removed in practically the same manner as is shown in Fig. 1, two cuts sufficing—the first is exactly similar to the corresponding one in the Rutherglen graft. When making the second cut, an oscillatory movement should be given to the knife so as to cut without splitting when passing through the twisted fibres underlying the bud. If skilfully removed, the section will be a plane surface, and the scion-bud ready for immediate

insertion in the cavity prepared to receive it, without any paring or trimming.

In preparing the stock, three cuts are all that are needed. The cavity is somewhat similar to that made in the last graft, but deeper. The graft is, in fact, very similar to the Spanish "Yema," as shown in Fig. 1, but deeper and shorter. If neatly executed, and with scions thoroughly suited to the size of the stock, the buds are so firmly held that no tie is necessary. The operation of grafting is thus considerably simplified, both by the suppression of several cuts, and by enabling tying to be dispensed with, so that a greater number of vines can be grafted in a given time than by the graft previously described. As regards the perfection of the unions, there does not seem to be much to choose between the two methods; with both they are remarkably perfect.

## STOCK REQUIREMENTS.

When planting the vines, care should be taken to see that there is a straight portion of stem where the bud can conveniently be inserted, about 2 or 3 inches above the level of the soil. The most convenient size

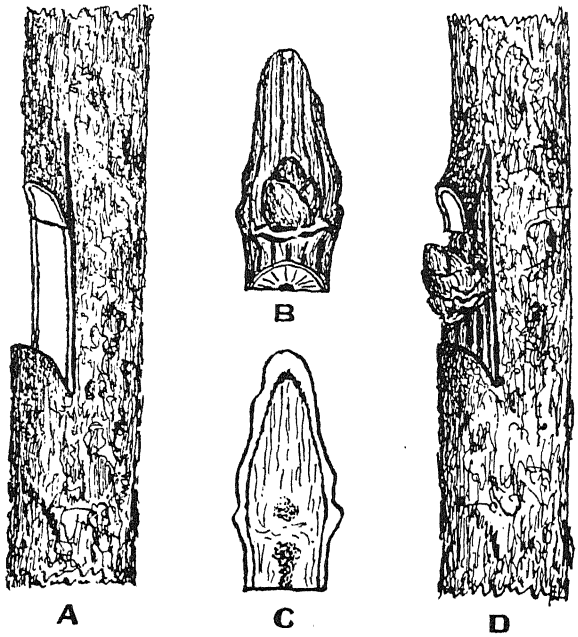



FIG. 7.—MR. ROUNCE'S MODIFICATION.
A, preparation of stock; B, outer view of scion bud; C, inner view of same; D, the completed graft.

is when the diameter of the stock is about half an inch. When larger, the operation is less convenient. Smaller stocks can, however, be successfully grafted. One very successful grafter remarked to the writer that

he was not afraid how small the stock was, provided he could find scion-buds small enough. Vines planted in August are usually fit for grafting the following February, save in an exceptionally dry season.

In order to insure success, the stock must be well in sap. In other words, it must have plenty of life in it. Should there be a good fall of rain during January, conditions are usually ideal for this graft during the month of February, but even in the absence of summer rain, with vines planted on properly prepared land, and adequately cultivated during spring and early summer, there will be plenty of sap for success.

## SCION REQUIREMENTS.

As has been shown, the scion should be taken from a cane of rather smaller diameter than the stock on which it is to be grafted. The question arises whether lateral shoots are eligible as scions, or whether main canes only should be used. Seeing that laterals are really quite as capable of producing fruit as main canes, there should be no objection to their use, provided they are well constituted and not too pithy. Needless to say, the same rigorous care is necessary in the selection of the scion buds as in the case of scions for ordinary spring grafting. They should, in the first place, be only taken from vines picked on account of the quality and quantity of the fruit they yield. In the second place, only fruit-producing canes must be used; water shoots and suckers should on no account be employed. Of course, laterals must only be those growing on fruit-bearing canes; any others are useless.

Buds should only be taken from canes which are properly ripened, the green or yellow colouration having changed to brown; unripe buds are, it is true, capable of uniting, but they are not nearly so sure; with them one cannot rely upon a high percentage of success. Buds should be free from laterals; in practice it is often found that a bud which has failed, or has taken in an unsatisfactory manner, shows the fragment of a small lateral alongside of it, which was cut back at the time of grafting. Where the Yema graft is to be practised on a large scale, it would be well to prepare the canes to be used as scions by breaking out the laterals in November-December, when they are still quite small and easily suppressed. Well-developed laterals are less liable to have secondary laterals in the axil of the leaf, for which reason they are very convenient to use. If the main canes of the vines used as scion bearers are stopped early in November, stout laterals will be thrown out, which will be well ripened by February.

Needless to say every precaution must be taken to avoid drying out of the scion canes. The season best suited for this graft being the hottest time of the year, only a few hours' requirements should be cut

at a time, and these should be rolled in a piece of wet bag; they should not, however, be cut into short lengths and kept floating in a bucket of water as is sometimes done.

The graft is, in fact, more practical if scions are obtainable in the same vineyard where they are to be grafted than if they have to be brought a distance; in the latter case they must be packed in such a way as to guard against desiccation in transit, and before use the canes should be placed for a day with their butt ends in clean water.

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# NEGLECTED INDUSTRIES.

## THE UTILISATION OF WASTE RAISIN SEEDS IN THE UNITED STATES.

An investigation has recently been made by the United States Government which has proved that the seeds removed from raisins yield technically useful products that fully justify the expense involved in separating them. In the raisin-seeding industry, which in recent years has grown to such proportions in California, vast quantities of seed accumulate annually. From 30,000 to 40,000 tons of raisins are seeded every year, and it is estimated that there should be approximately 3,000 to 4,000 tons of the seed available annually. The utilisation of this waste has received some attention by the producers in recent years, but thus far with little success. It appears that a brandy has been made by fermenting the sugary matter that adheres to the seeds, and that a high-proof alcohol has been distilled after the fermentation. It is also reported that some fixed oil has been obtained from the seeds. The investigation shows that four important products can be obtained from the waste seeds—namely, syrup, fixed oil, tannin extract, and meal.

If the entire annual output of 3,000 to 4,000 tons of seed were used, there would be obtained 550 to 750 tons of syrup, 340 to 450 tons of fixed oil, 330 to 440 tons of tannin extract, and 1,600 to 2,200 tons of meal. Commercially, the manufacture of syrup can be accomplished with comparative ease and readiness. Owing to the solubility of the sugars in water, the process of preparation resolves itself into simple extraction and concentration. Comparatively small quantities of water are necessary completely to dissolve the sugary matter from the seeds. The washing could possibly be most readily accomplished in large centrifuges, while the saturated solution requires only to be evaporated to produce the syrup. As the most convenient form of concentrating, vacuum pans

are considered to be the most efficient and expedient. A clear transparent syrup with the characteristic taste and flavour of the raisin can be produced from the seeds. Its uses are many, and should justify its production from this waste material. The fixed oil has been mentioned as found in considerable quantities in the seeds of raisins, and also in the seeds of grapes which occur as by-products in the manufacture of wine and grape juice. After washing off the sugary matter and drying and screening the seeds, they need only to be ground for the production of the fixed oil. Two methods of extraction are feasible—by pressure and by solvents. Hot extraction by means of hydraulic presses would possibly yield, it is said, the maximum of fixed oil. Cold pressure having a tendency to extract the oil incompletely would leave more fat in the press cake. Extraction by means of solvents such as benzine, carbon bisulphide or low-boiling gasoline, or preferably carbon tetrachloride, is practised commercially because of the more complete exhaustion than by pressure, especially of materials with low oil content. The use of carbon tetrachloride has been recommended because of the non-inflammable, non-explosive properties of these solvents. The clear amber-coloured fixed oil, useful in paint and soap manufacture, and possibly in other industries, is capable of being produced in large quantities from the waste seeds.

The important application of the oil in commerce, coupled with the large output available annually, should justify its production. After the preparation of the syrup and the extraction of the oil from the seeds, the extraction of tannin has been recommended. The production of tannin extract is practicable only in the case of raisin seeds, since wine residues are probably largely depleted of their tannin content. The tannin, being soluble in water, can be extracted in a practical way by boiling the meal in large vats, the solution being transferred to vacuum pans for concentration to a moist extract. If a dry extract is preferred, it can be obtained by simply allowing the moist extract to dry in the air. The large quantity of tannin extract which can be produced from raisin-seed meal, and which is well adapted for the tanning of leather, becomes the third important commercial product capable of being made from raisin seeds. The final residue, the meal, seemingly already exhausted of all its constituents of value, still possesses useful qualities. On account of its high protein content its usefulness as part, at least, of a cattle food is undoubted.—"Journal of the Royal Society of Arts."

# Botany.

## ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, Acting Government Botanist.

No. 8.

"GIANT PIG WEED" (*Trianthema portulacastrum*, Linn.)

*Description.*—A spreading rather succulent herb. Stems much branched, glabrous or slightly pubescent. Leaves opposite or nearly so, one smaller than the other, tapering at the base, rounded, and often with a small point at the apex. Leaf-stalk dilated and connate at the base, forming a deeply triangular membraneous pouch in which are situated the solitary flowers. Capsule small, almost concealed in the stipular pouch, and containing about eight seeds. A weed of the tropics. Has recently made its appearance in Queensland.

Mr. D. Macpherson (Instructor in Agriculture, Bowen) writes: "The weed is a most troublesome one in Bowen farms. For want of a better name, I call it Giant Pig Weed. Stock are said to be very fond of it." As I know of no other local name given to the plant and as it is closely allied to and similar in appearance to the common Pig Weed, I would suggest the use of Mr. Macpherson's name as a vernacular.

*Distribution.*—E. D. Merrill speaks of it as a common weed of cultivation and of open waste places about towns in the Philippine Islands. Dr. S. H. Koorders says that except on the highlands it is a common roadside weed over the whole of Java. It is a common weed in the West Indies, subtropical United States, and Tropical America generally. In India it is spoken of as a troublesome weed that springs up everywhere.

*Uses.*—"The young leaves are used as Spinach; when somewhat old mixed with others and used as greens. The root is considered cathartic and given in powder to the extent of two teaspoonfuls twice daily with a little ginger; the fresh root also is given as a cathartic mixed with ginger." Balfour—"Cyclopaedia of India," 3, p. 931. Its palatability for stock has already been referred to.

*Eradication.*—Like Pig Weed and plants of similar habit, it can only be kept in check by constant hoeing and cultivation, which should be done before seeding.

*Botany of the Species.*—The plant is to be met with in botanical literature under several different names. The following are those it has received at different times:—

1753. *Trianthema portulacastrum*, Linn. Sp. Pl. 223.
1767. *Trianthema monogyna*, Linn. Mant. Pl. 1: 69.
1813. *Trianthema obcordata*, Roxb. Hort. Beng. 34.
1828. *Trianthema decandra*, L. *var. obcordata*, DC. Prod. 3: 352.



PLATE 15.—"GIANT PIG WEED." (*Trianthema portulacastrum*, Linn.)

# Tropical Industries.

## QUEENSLAND SUGAR MILLS.

### CRUSHING DATES.

The following is a list of crushing dates as given in the "Australian Sugar Journal" of 10th May, 1917:—

| | |
|---|---|
| Mossman Mill | 31st May |
| Mulgrave Mill | About 30th May |
| Goondi Mill | Early in June |
| Macknade Mill | Early in June |
| Victoria Mill | Early in June |
| Pioneer Mill | 15th May |
| Inkerman Mill | 4th June |
| Cattle Creek Mill | 6th June |
| Marian Mill | 30th May |
| Plane Creek | About 11th June |
| Pleystowe Mill | 6th June |
| Racecourse Mill | 6th June |
| Doolbi Mill | 1st week in June |
| Invicta Mill | 5th June |
| Qunaba Mill | 1st week in June |
| Waterloo Mill | 5th June |
| Baffle Creek | Middle of July |
| Isis Central Mill | 1st week in June |
| Maryborough Sugar Factory | Early in July |
| Millaquin | 2nd week in June |

### THE COMING HARVEST.

For the present season cutting will commence early this year, about May, and will end about December. Queensland growers will receive, provided the crop anticipations of 260,000 tons prove correct, £5,811,000 for their output instead of £4,680,000, or £1,131,000 more than they would have received under former conditions. And the consumer will not be called upon to pay a fraction more than the prevailing price of 3½d. per lb.

Some of the Queensland estimates place the season's output as high a figure as 300,000 tons, but this may be an exaggeration. There is, however, every reason to expect that the supply will equal the consumption, and if the growers obtain, as they anticipate they will, relief, on appeal, from some of the more onerous conditions of the Dickson award, the result of the year's operations will probably lead to further acreage being placed under cultivation.

# Entomology.

## PARASITES OF THE CANE BEETLE.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. Edmund Jarvis, Entomologist:—

"With reference to the question of insect enemies attacking the imago or beetle stage of our cane beetle, it may be of interest to record the occurrence of a new tachinid fly bred at Gordonvale Laboratory last January from a specimen of the grey-back cockchafer.

"This parasite, which strongly resembles a large house-fly, is nearly three-eighths of an inch long and of strikingly handsome appearance; the head and thorax being dull golden, the latter striped longitudinally with two broad blackish bands, which on the prothorax are ornamented by a central streak of the same rich hue.

"The basal half of the scutellum is blackish, while the dark reddish-brown abdomen is barred transversely with three silvery-white bands, and bears towards its extremity a number of stout bristles.

"It was found that a female of *Lepidiota albohirta* infested by a single maggot of this tachinid was able, notwithstanding, to mature and deposit fourteen eggs before succumbing to its injuries.

"This beetle, however, was collected from forest land, so, although living for a fortnight in confinement, may, of course, have been parasitised just prior to its capture. The eggs of such parasitic diptera are deposited externally, being firmly glued to the body of the host in such position as to render removal difficult, and enable the tiny larvæ when hatched to bore at once through the skin of their victim preparatory to feeding on its internal tissues.

"In the present instance, judging by the size of albohirta, we may reasonably assume that the parasite in question normally lays two or more eggs on a single beetle, in which case the resultant maggots would probably soon inflict serious injuries, and by entirely destroying the ovaries of their unfortunate host, effectually prevent it from ovipositing.

"In view of the fact that the cockchafer caught last January harboured only one dipterous larva, it appears likely that the eggs of this useful fly are subject to attack from hymenopterous parasites belonging to the family Proctotrypidæ, which operate as a natural check on its increase.

"Our grey-back cane-beetle is, I think, very liable to victimisation by dipterous parasites, owing to its habit of remaining on the feeding trees all day in a motionless or semi-torpid state, and fully exposed to the assaults of such insect enemies.

" The only other dipteron obtained at Gordonvale from the adult form of albohirta is a small fly measuring five-sixteenths of an inch in length, with dull yellow thorax and legs, dark reddish-brown abdomen, and blackish head. This insect, which was first noticed in 1914 but has not yet been identified, appears to belong to the *Tachinidæ*, and is evidently an abundant species. Numerous specimens were bred here last season, the number of maggots found in a single beetle varying from three to a dozen.

" It no doubt helps to thin the ranks of our notorious cane-beetle very materially, although, unfortunately, like the preceding, this fly probably suffers from the attacks of hyperparasites.

" Both these diptera, however, are of considerable scientific interest, since they infest the perfect insect, which, in our case, happens to be peculiarly susceptible to injuries from foes of this kind.

"Alluding very briefly to other dipterous parasites bred by us during the past two years from various species of root-eating scarabæid larvæ affecting cane. I may mention that these include no less than eight different kinds of Dexidæ, and four of Asilidæ, the former resembling in general shape gigantic blowflies, and being frequently adorned with brilliant metallic tints of greenish-gold, blue, or deep crimson, while the latter (Asilidæ), familiarly known as 'robber flies,' are predaceous insects possessing stoutish moderately long bodies, which for the most part are hairy and of obscure colouration.

"These dexids and asilids infest the grubs of about eight species of our cane beetles, but apparently are too rigorously controlled by insect and other enemies to be of much economic value in Queensland.

" In addition to the foregoing, our scarabæid grubs frequenting cane fields are preyed upon by at least one species of elaterid larvæ; and by three kinds of 'digger wasps' (Scoliidæ), which in their turn are kept in check by hyperparasites belonging to the families Bombylidæ and Mordellidæ."

# General Notes.

## MOUSE PLAGUES.

BY HEBER A. LONGMAN, Queensland Museum.

The periodical occurrence of mouse plagues has engaged the attention of investigators in various parts of the world. The problem is of the greatest importance in countries like Australia and America, where there are wide stretches of agricultural land controlled by a comparatively small number of settlers. In America such plagues have proved a serious scourge, and publications dealing with the matter have been issued by the United States Departments of Agriculture. In one of these, issued in 1908, and written by Stanley E. Piper, particulars are given of the measures taken to check the plague in Nevada. The outbreaks there are exceptionally severe because they occur in rich lands, more or less restricted by surrounding desert conditions. The trouble has even lasted



PLATE 16.—ALFALFA FIELD DESTROYED BY FIELD MICE. GENERAL CONDITION OF FIELDS IN HUMBOLDT VALLEY, NEVADA, IN NOVEMBER, 1907.

for three or four years, and it was found necessary to take very stringent measures. The mice which occasionally increase in Australia are not, of course, the same species as run riot in America. Particulars of the more common native and introduced species of rodents found in Australia are given in a booklet by the writer which was recently issued by the Commonwealth Quarantine Service.



The following particulars of the methods adopted in Nevada to control their mouse plagues are summarised from Mr. Piper's paper. He states that such methods as rolling the land with heavy cylinders, trampling it with droves of sheep, or injecting water or steam into burrows, are inadequate for the suppression of large plagues. Digging trenches or pits wider at the bottom than the top, into which the mice fall, and other methods of trapping, only account for a small proportion. In France and Russia and the States attempts have been made to establish bacterial disease, but these have not proved a marked success.

Poison is claimed to be the cheapest and most certain means at present known of controlling mouse plagues. Phosphorus is condemned on account of its dangerous character and its destructiveness to birds and mammals. As the result of extensive experiments and practice, strychnia sulphate was found to be the most satisfactory poison. Strychnia sulphate, when prepared in the following ways, was found to be the cheapest poison available:—

1. *Poisoned Alfalfa Hay.*—Chop 30 lb. of good, fresh alfalfa (lucerne) hay into about 2-in. lengths with a feed cutter. Then place the hay in a large metal receptacle and sprinkle with 3 gallons of fresh water. Thoroughly dissolve 1 oz. of strychnia sulphate in 2 gallons of water by heating in a closed vessel; sprinkle over the dampened hay and mix well.

2. *Poisoned Green Alfalfa (Lucerne).*—Heat 1 oz. of strychnia sulphate in half a gallon of water until thoroughly dissolved, add to 1 gallon of cold water, and sprinkle this solution slowly over 45 lb. of fresh green alfalfa, cut into lengths of 2 or 3 in. Mix until the free solution is taken up.

3. *Poisoned Crushed Wheat.*—Dissolve 1 oz. of strychnia sulphate in 2 gallons of water by heating. Sprinkle the solution over 60 lb. of rolled or crushed wheat in a metal receptacle and mix well. If the preparation is to be kept for several days, two tablespoonfuls of powdered borax may be added to prevent fermentation.

The poisoned hay was found of best use in the winter, when green food was absent. Men were employed to drop small quantities (about a teaspoonful) at the mouth of burrows. In some fields it was calculated that there were 10,000 to 24,000 mouse holes to the acre, and it is said that a systematic treatment of the land resulted in the destruction of 85 to 95 per cent. of the mice.

Poisoned green alfalfa proved very successful, as the mice had been in the habit of feeding on the lucerne. Poisoned crushed wheat was distinctly better than the whole grain, but this is *not to be recommended* for field use, because a *large number of useful birds fell victims to the poisoned grain.* With the poisoned green alfalfa and alfalfa hay no accidents to birds or domestic animals were reported.

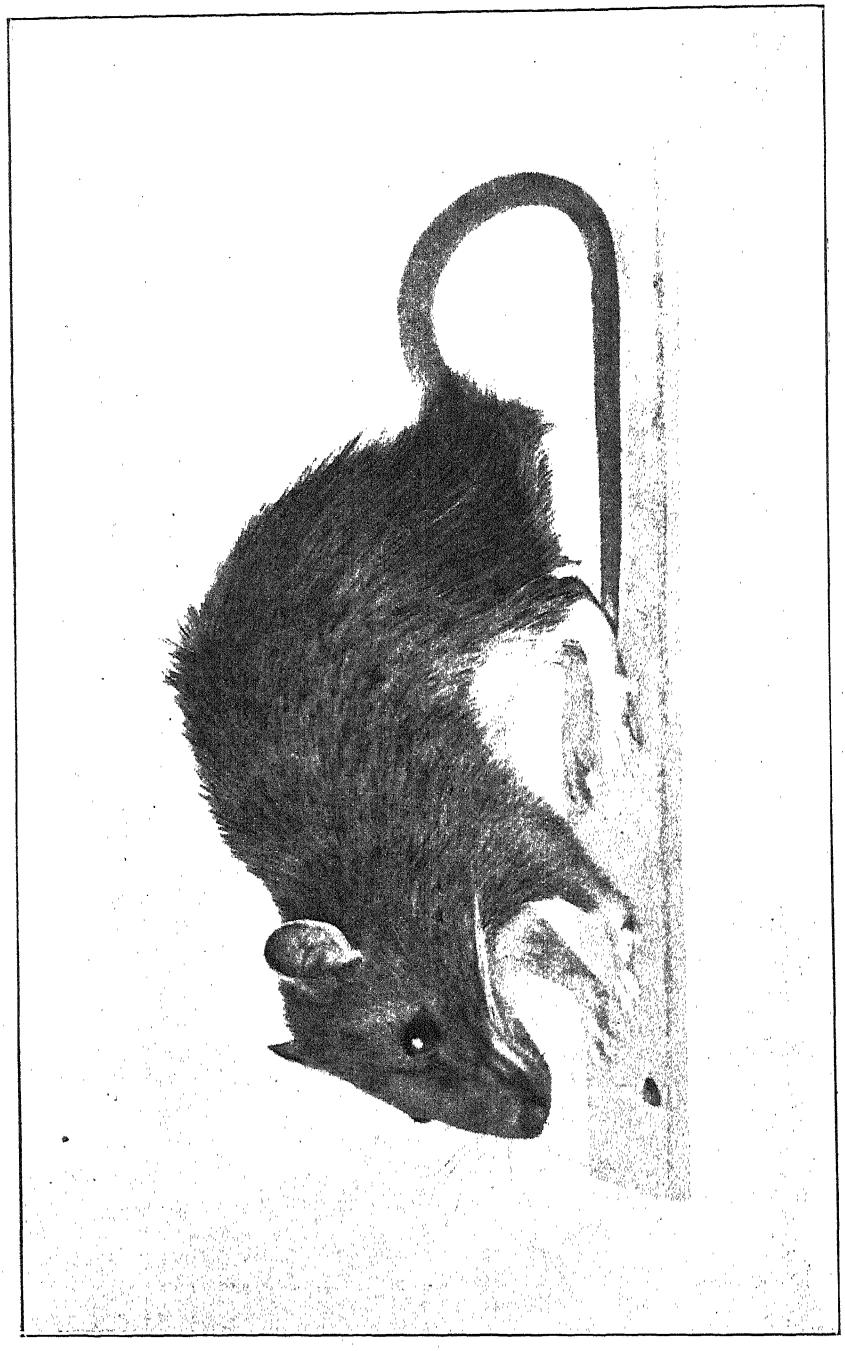


PLATE 18.—THE BLACK RAT (*Epimys rattus*, Linn).
The full length of the tail is not shown.

[From life.

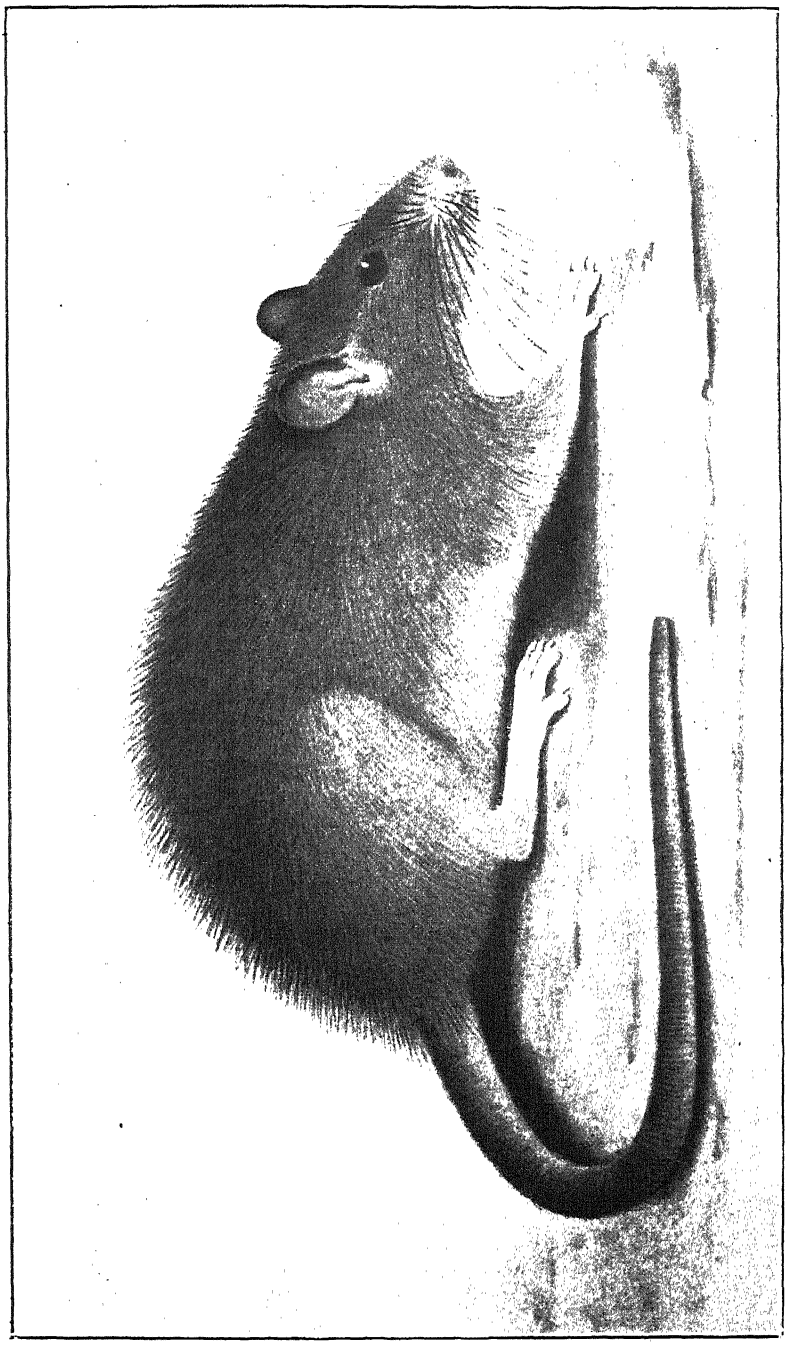


PLATE 19.—THE BROWN RAT (*Epimys norvegicus*, Erlx). [After Hossack.

In order to prevent plagues various measures are recommended. Winter burning, flooding, and pasturing off growth are aids. When land is being ploughed dogs should be encouraged to kill the mice turned up. Rank grasess and weeds along fences and ditches should be destroyed as far as possible, and then the mice will be exposed to the attacks of their natural enemies. Above all, the birds which prey upon mice should be encouraged.

Queensland to-day is losing many thousands of pounds because so many of our native birds, which would prey on these pests, have been destroyed. Owls, hawks, the kestrel, and the crow take an enormous toll of mice, and near the coast flocks of gulls have been known to destroy them. The wild turkey or Australian bustard, which is a valuable insect destroyer, feeds also on lizards and mice, and is probably worth more to the farmer alive and in the field than when cooked and on the table. The nankeen kestrel, the smaller eagles, and other members of the hawk family, and the owls are invaluable helpers during a plague of mice. Australia has no weasels or skunks to prey on mice. Although few people care to encourage snakes, yet it should be mentioned that the young of the harmless carpet snakes are great feeders on mice, just as the adults are useful in keeping a barn clear of rats.

[Mr. Longman's "Notes on Classification of Common Rodents," with list of Australian species, published under the authority of the Commonwealth Minister for Trade and Customs, is most informative and well illustrated. From it we select photographs of the Black Rat, which, although now rare in England, is quite as common as the Brown Rat in Australia, and the Common Field Mouse.]

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## INFECTION FROM RAW COTTON.

In April last we drew attention to the fact that there never has been an instance of any disease being contracted by the use of Queensland cotton either in upholstery or when made up into mattresses or pillows. On the other hand, we suggested that kapok, being a product of countries where coloured labour is employed in its preparation, under no medical supervision, might easily convey disease germs, although we certainly have not heard of any specific cases. In an article in the "Journal of the Royal Society of Arts" (19th June) on the "Development of the Textile Industries," we find the following notes on "Smallpox and Cotton":—

"An outbreak of smallpox in a Lancashire mill has been attributed, upon circumstantial evidence, to contagion carried by raw cotton, and the millowners have been prevailed on to destroy their stock of cotton-waste. Cotton has been accused in a similar way in at least one other instance, but there has been no proof absolute such as is obtainable in respect of anthrax from wool. English mills use well over 2,000,000,000 lb. of raw cotton annually, and import it from countries where smallpox is always more or less rife. It may, therefore, be held that were the transmission other than the rarest of occurrences the spread of the disease must have arrested attention long ago. The particular

cotton suspected is Mexican, and may actually be a portion of the produce seized by the insurgents, for which the rightful owners have not been paid. In view of the quantities of material involved, and their concentration upon certain centres, the impressive fact about the importation of textile materials is the extreme rarity of cases of infection with any zymotic disease. If one material more than another might be expected to carry disease that one should be rags, yet the advices from the rag centres are most reassuring. The last published report from the Medical Officer of Health in Batley disclaims any knowledge or suspicion of infectious diseases imparted from rags. Much the same thing has been said by the Health Officer for Dewsbury, and the registrars of these districts find that zymotic diseases are about the only ones of which rag sorters never die. It may be added that the workers of the woollen district are by no means well vaccinated."

## SOCIETIES, SHOW DATES, ETC.

Gayndah Pastoral, Industrial, Agricultural, and Horticultural Society.—The show dates have been changed from 5th and 6th June to 26th and 27th June.

Proserpine.—Proserpine Agricultural, Pastoral, and Industrial Association. Arthur George Clarke. Show dates 17th and 18th August.

## LONDON QUOTATIONS.

Copra: South Sea, £50 per ton.

Rubber: Fine, hard Para, 3s. per lb.; plantation, 2s. 11⅞d. per lb.

Middling Uplands cotton, American, 12·36d. per lb.

Sisal hemp: British East African, £70 to £75 per ton; Mexican, £77 per ton.

Mauritius hemp, £49 to £53 per ton.

In the year 1912 sisal hemp was worth £24 per ton in Queensland, and the cost of production was £12 per ton, leaving a profit of £12 per ton. A sisal plantation to-day at war prices would prove a fortune, even if expenses were double what they were years ago.

# Answers to Correspondents.

## TREATMENT FOR WORMS IN FOWLS.

E. M. LEGGETT, Gayndah—

If the number of birds kept is few they may be treated individually by giving pills made of lard or butter to which add santonine, one grain, areca nut, seven grains, or equal quantities of oil of turpentine and olive oil, thirty drops of this mixture to be given at a dose. Either medicine to be followed in two hours with one tablespoonful of olive oil. Lesser quantities according to age.

If a large number of birds is to be treated it will take up too much time treating individually; therefore, the medicine should be given in the morning mash. This may be done by dividing the usual quantity of mash into two parts. To one part add one teaspoonful oil of turpentine, or one grain santonine and seven grains areca nut to each bird; and to the other part add one teaspoonful of castor oil to each bird. The mashes to be given at intervals of two hours, a lesser proportion of the medicine to be given to chickens according to age.

Preventive measures must be taken at the same time as the medical treatment, otherwise the birds will be immediately reinfested by eggs or embryos of worms, taken up with the food or water. It is, therefore, advisable after treating the birds to remove them on to fresh ground, and to thoroughly clean the houses and runs and disinfect same with some strong solution.

A little kerosine in their drinking water will also act as a good preventive.

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## LIME IN AGRICULTURE.

The Queensland Cement and Lime Company in Brisbane, and the Australian Co-operative Fertilisers, Limited, have communicated the following with reference to the prices of pulverised lime in connection with those companies, which we publish for general information:—

"Brisbane, 18th May, 1917.

"LIME IN AGRICULTURE.

"DEAR SIR,—In the May issue of the "Queensland Agricultural Journal," under the above heading, are tabulated prices which are represented as the retail rates of ground limestone, and the information is quoted as being supplied by the firms whose names are made use of.

"For your readers' correct information we would mention that the Under Secretary of the Department of Agriculture wrote to each of the undersigned on the 20th February, and asked for the retail prices of pulverised lime for publication in the 'Queensland Agricultural Journal.' The Queensland Cement and Lime Company replied that they were referring the matter to the Australian Co-operative Fertilisers, Limited, who were their sole distributing agents for this product. There were no prices of pulverised lime quoted to the Department by the Queensland Cement and Lime Company for publication.

"Apparently it is the figures quoted in a business way to the Department as a contract price for three years, and which were refused by the Department, were published as the retail price in truck loads. Further, although it was distinctly stated that the Department must supply the bags delivered at Gore, yet in the reference to this company in the Journal, the information is conveyed that the company will supply ground limestone at £1 per ton in bags and in truck loads, which is contrary to fact. The second firm whose figures are quoted in the list is the Australian Co-operative Fertilisers, Limited, who are credited with supplying pulverised lime at £2 5s. per ton. The letter of the 20th February from the Department was promptly replied to by this firm, under date of the 24th February, stating, in perfect definiteness, that the Q.C. and L. Company's product was marketed by the A.C.F., Limited, and that the retail price was for 6-ton truck lots, £2 5s. per ton, freight paid to any station in Southern Queensland, and as far north as Nambour; and that north from there to 40 miles north to Bundaberg the rate was the same—viz., £2 5s. per ton for 6-ton truck lots freight paid, and that the demand was supplied to those districts from the A.C.F., Limited, own works at Degilbo lime quarries.

"The omission of the mention of freight being prepaid is entirely misleading.

"The Department invited us to supply the information, and it was supplied unhesitatingly; but through the incorrect way that it has been set out to the readers of the "Agricultural Journal," a false impression has been created, which we trust will be removed by the above statement of facts.

"As far as we are aware, we are the only two companies in Queensland who are pulverising the limestone for agricultural uses, and the limestone that is being used for the purpose is the best that is available.

"The pulverising machinery, both at Gore and Degilbo, was installed solely for preparing an agricultural lime fertiliser, and the article that is available is exactly what the Department of Agriculture has been advocating the use of.

"Queensland Cement and Lime Company, Limited,
"A. C. ELPHINSTONE, General Manager.

"Australian Co-operative Fertilisers, Limited,
"B. SHEARER, Manager.

"To the Editor,
"Queensland Agricultural Journal, Brisbane."

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MAY, 1917.

| Article. | | MAY. Prices. |
|---|---|---|
| Bacon | lb. | 9d. to 1s. |
| Barley | bush. | 2s. 3d. to 2s. 6d. |
| Bran | ton | £5 |
| Broom Millet | " | £23 to £24 |
| Butter | cwt. | 149s. 4d. |
| Chaff, Mixed | ton | £3 10s. to £4 5s. |
| Chaff, Oaten | " | £5 5s. to £6 |
| Chaff, Lucerne | " | £4 10s. to £5 15s. |
| Chaff, Wheaten | " | ... |
| Cheese | lb. | 9d. to 9½d. |
| Flour | ton | £12 |
| Hams | lb. | 1s. 3d. to 1s. 4d. |
| Hay, Oaten | ton | £4 10s. |
| Hay, Lucerne | " | £3 5s. to £3 7s. |
| Honey | lb. | 4½d. to 5d. |
| Maize | bush. | 2s. 4d. to 2s. 6d. |
| Oats | " | 3s. to 4s. |
| Onions | ton | £9 to £10 |
| Peanuts | lb. | 2d. to 3½d. |
| Pollard | ton | £6 12s. 6d. |
| Potatoes | " | £5 to £5 5s. |
| Potatoes (Sweet) | cwt. | 2s. 6d. to 3s. |
| Pumpkins (Cattle) | ton | £2 10s. to £2 15s. |
| Eggs | doz. | 1s. 8d. to 2s. 3d. |
| Fowls | pair | 3s to 4s. 6d. |
| Ducks, English | " | 3s. to 3s. 6d. |
| Ducks, Muscovy | " | 4s. to 5s. 3d. |
| Geese | " | 7s. to 7s. 6d. |
| Turkeys (Hens) | " | 7s. 6d. to 8s. |
| Turkeys (Gobblers) | " | 13s. to 17s. |
| Wheat | bush. | 3s. 6½d. |

## VEGETABLES—TURBOT STREET MARKETS.

| | |
|---|---|
| Asparagus, per bundle | ... |
| Cabbages, per dozen | 4s. to 10s. |
| Cauliflowers, per dozen | ... |
| Celery, per bundle | ... |
| Cucumbers, per dozen | 9d. to 1s. 6d. |
| Beans, per sugar bag | 4s. to 7s. |
| Peas, per sugar bag | 7s. to 11s. |
| Carrots, per dozen bunches | 10d. to 1s. |
| Chocos, per quarter-case | 1s. 3d. to 2s. |
| Beetroot, per dozen bunches | 8d. to 9d. |
| Marrows, per sack | 5s. 6d. to 6s. |
| Lettuce, per dozen | 1s. to 2s. |
| Parsnips, per bundle | 6d. to 9d. |
| Sweet Potatoes, per sugar bag | 1s. 6d. to 1s. 9d. |
| Table Pumpkins, per sugar bag | 3s. to 4s. |
| Tomatoes, per quarter-case | 3s. to 6s. |
| Vegetable Marrows, per dozen | ... |
| Turnips, per dozen bunches | 10d. to 1s. |
| Rhubarb, per dozen bundles | ... |

## SOUTHERN FRUIT MARKETS.

| Article. | MAY. Prices. |
|---|---|
| Bananas (Queensland), per case | 6s. to 12s. |
| Bananas (Fiji), per case | 15s. to 16s. 6d. |
| Bananas (G.M.), per case | 16s. 6d. to 18s. |
| Custard Apples, per 12 to 15 tray | 5s. to 6s. 6d. |
| Lemons (Local), per bushel-case | 2s. 6d. to 5s. |
| Mandarins, per case | 10s. to 12s. |
| Oranges (Navel), per case | 7s. 6d. to 10s. |
| Oranges (other), per case | 3s. 6d. to 5s. 6d. |
| Papaw Apples, per half-bushel-case | 7s. to 9s. |
| Passion Fruit, per half-case | 1s. 6d. to 6s. 6d. |
| Persimmons, per half-case | 1s. 6d. to 3s. 6d. |
| Pineapples (Queens), per case | 10s. to 12s. |
| Pineapples (Ripleys), per case | 8s. to 10s. |
| Pineapples (Common) per double-case | 4s. to 6s. |
| Tomatoes (Queensland), per half-bushel-case | 1s. 6d. to 3s. 6d. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | MAY. Prices. |
|---|---|
| Apples, Eating, per case | 11s. to 12s. |
| Apples, Cooking, per case | 10s. to 11s. |
| Bananas (Cavendish), per dozen | 1d. to 3½d. |
| Bananas (Sugar), per dozen | 2½d. to 3½d. |
| Citrons, per hundredweight | 10s. |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per quarter-case | ... |
| Custard Apples, per tray | 4s. to 5s. 6d. |
| Granadillas, per quarter-case | ... |
| Grapes, per lb. | 5d. to 6d. |
| Lemons (Lisbon), per quarter-case | 5s. to 5s. 6d. |
| Limes, per quarter-case | 3s. to 4s. 6d. |
| Mandarins, per quarter-case | 6s. 6d. to 8s. 6d. |
| Nectarines, per quarter-case | .. |
| Oranges (Navel), per case | 9s. to 10s. |
| Oranges (other), per case | 1s. 8d. to 4s. 6d. |
| Papaw Apples, per quarter-case | 1s. 6d. to 2s. 6d. |
| Passion Fruit, per quarter-case | 5s. to 7s. 6d. |
| Peaches, per quarter-case | ... |
| Pears, per quarter-case | 9s. to 10s. 6d. |
| Peanuts, per lb. | 3d. to 3½d. |
| Persimmons, per quarter-case | 4s. to 5s. |
| Plums, per quarter-case | ... |
| Plums (prime eating), per case | ... |
| Pineapples (Ripleys), per dozen | 5s. to 8s. |
| Pineapples (Rough), per dozen | 5s. to 6s. |
| Pineapples (Smooth), per dozen | 5s. to 7s. |
| Quinces, per quarter-case | 3s. |
| Rosellas, per sugar bag | 1s. 6d. to 2s. |
| Tomatoes, per quarter-case | 3s. to 6s. |
| Watermelons, per dozen | ... |

## TOP PRICES, ENOGGERA YARDS, APRIL, 1917.

| Animal. | APRIL. Prices. |
|---|---|
| Bullocks ... ... ... ... ... ... ... ... | £20 to £24 5s. |
| Bullocks (Single) ... ... ... ... ... ... | |
| Cows ... ... ... ... ... ... ... ... | £12 2s. 6d. to £16 |
| Merino Wethers ... ... ... ... ... ... ... | 43s. |
| Crossbred Wethers ... ... ... ... ... ... | 46s. |
| Merino Ewes ... ... ... ... ... ... | 36s. |
| Crossbred Ewes ... ... ... ... ... ... ... | 42s. 6d. |
| Lambs ... ... ... ... ... ... ... ... | 46s. 6d. |
| Pigs (Stores) ... ... .. ... ... ... ... | |

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF APRIL IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING APRIL, 1917 AND 1916, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | | Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|---|---|---|---|---|
| | April. | No. of Years' Records. | April, 1917. | April, 1916. | | April. | No. of Years' Records. | April, 1917. | April, 1916. |
| *North Coast.* | | | | | *South Coast*—continued: | | | | |
| | In. | | In. | In. | | In. | | In. | In. |
| Atherton ... ... | 4·34 | 15 | 4·85 | 2·26 | Nambour ... ... | 4·38 | 20 | 2·85 | 9·27 |
| Cairns ... ... | 11·99 | 34 | 8·95 | 6·36 | Nanango ... ... | 1·80 | 34 | 0·42 | 6·36 |
| Cardwell ... ... | 10·05 | 44 | 6·04 | 4·65 | Rockhampton ... | 2·27 | 29 | 0·82 | 2·79 |
| Cooktown ... ... | 9·48 | 40 | 6·42 | 9·36 | Woodford ... ... | 3·90 | 29 | 1·13 | 14·45 |
| Herberton ... ... | 4·42 | 29 | 3·60 | 2·76 | | | | | |
| Ingham ... .. | 8·86 | 24 | 7·98 | 4·22 | | | | | |
| Innisfail ... ... | 22·15 | 35 | 15·70 | 19·83 | | | | | |
| Mossman ... ... | 7·99 | 1 | 9·78 | 8·57 | *Darling Downs.* | | | | |
| Townsville ... ... | 3·81 | 45 | 3·25 | 0·05 | | | | | |
| | | | | | Dalby ... ... | 1·29 | 46 | 1·94 | 1·81 |
| | | | | | Emu Vale ... ... | 1·16 | 20 | 0·29 | 2·34 |
| *Central Coast.* | | | | | Jimbour ... ... | 1·33 | 28 | 1·24 | 3·31 |
| | | | | | Miles ... ... | 1·46 | 31 | 0·87 | 2·19 |
| Ayr ... ... ... | 2·85 | 29 | 2·80 | 0·26 | Stanthorpe ... | 1·75 | 43 | 0·37 | 3·97 |
| Bowen ... ... | 3·12 | 45 | 1·58 | 0·96 | Toowoomba ... | 2·44 | 44 | 1·74 | 7·92 |
| Charters Towers ... | 1·77 | 34 | 0·19 | 1·71 | Warwick ... ... | 1·35 | 29 | 0·06 | 2·77 |
| Mackay ... ... | 6·90 | 45 | 3·27 | 5·98 | | | | | |
| Proserpine ... ... | 6·56 | 13 | 9·44 | 4·11 | | | | | |
| St. Lawrence ... | 2·83 | 45 | 2·17 | 3·05 | *Maranoa.* | | | | |
| | | | | | | | | | |
| *South Coast.* | | | | | Roma ... ... | 1·31 | 42 | 0·67 | 1·78 |
| | | | | | | | | | |
| Biggenden ... ... | 1·68 | 17 | 0·39 | 1·75 | *State Farms, &c.* | | | | |
| Bundaberg ... ... | 2·78 | 33 | 1·99 | 3·96 | | | | | |
| Brisbane ... ... | 3·62 | 64 | 0·75 | 8·95 | Bungeworgorai ... | 0·79 | 4 | 0·28 | 0·65 |
| Childers ... ... | 2·33 | 21 | 1·71 | 3·56 | Gatton College ... | 1·73 | 17 | 0·53 | 4·83 |
| Crohamhurst ... | 5·42 | 25 | 2·63 | 16·63 | Gindie ... ... | 1·27 | 17 | 0·04 | 1·19 |
| Esk ... ... ... | 2·60 | 29 | 1·73 | 6·91 | Hermitage ... | 1·25 | 10 | Nil | 3·25 |
| Gayndah ... ... | 1·29 | 45 | 0·84 | 2·79 | Kairi ... ... | 3·42 | 4 | 4·09 | 5·32 |
| Gympie ... ... | 3·13 | 46 | 1·32 | 2·80 | Kamerunga ... | 11·91 | 28 | 9·46 | 7·48 |
| Glasshouse M'tains | 3·89 | 8 | 2·15 | 13·77 | Sugar Experiment Station, Mackay | 4·97 | 19 | 5·24 | 8·03 |
| Kilkivan ... ... | 2·08 | 37 | 1·03 | 3·41 | Warren ... ... | 1·30 | 4 | 0·51 | 1·03 |
| Maryborough ... | 3·27 | 45 | 1·21 | 4·97 | | | | | |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for April this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

# ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

## TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON

| 1917. | MAY. | | JUNE. | | JULY. | | AUGUST. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets |
| 1 | 6·13 | 5·17 | 6·32 | 4·59 | 6·40 | 5·4 | 6·30 | 5·18 |
| 2 | 6·13 | 5·16 | 6·32 | 4·59 | 6·40 | 5·4 | 6·30 | 5·18 |
| 3 | 6 14 | 5·15 | 6·33 | 4·59 | 6·40 | 5·4 | 6·29 | 5·19 |
| 4 | 6 15 | 5·14 | 6·33 | 4·59 | 6·40 | 5·5 | 6·29 | 5·19 |
| 5 | 6·15 | 5·14 | 6·33 | 4 59 | 6·40 | 5·5 | 6·28 | 5·20 |
| 6 | 6 16 | 5·13 | 6·34 | 4·59 | 6·40 | 5·5 | 6·28 | 5·20 |
| 7 | 6·15 | 5·12 | 6·34 | 4·59 | 6·40 | 5·6 | 6·27 | 5·21 |
| 8 | 6·17 | 5 12 | 6·34 | 4·59 | 6·40 | 5·6 | 6·26 | 5·21 |
| 9 | 6·17 | 5·11 | 6 35 | 4 59 | 6·40 | 5·6 | 6 25 | 5 22 |
| 10 | 6 18 | 5·11 | 6·35 | 4·59 | 6 39 | 5·7 | 6·24 | 5·22 |
| 11 | 6·19 | 5·10 | 6·35 | 5 0 | 6·39 | 5·7 | 6 23 | 5·23 |
| 12 | 6 20 | 5·9 | 6·36 | 5·0 | 6·39 | 5·8 | 6 22 | 5·23 |
| 13 | 6 21 | 5·9 | 6·36 | 5·0 | 6·39 | 5·8 | 6 21 | 5 24 |
| 14 | 6·21 | 5·8 | 6·36 | 5·0 | 6·39 | 5·9 | 6·20 | 5·24 |
| 15 | 6·22 | 5·8 | 6·36 | 5 0 | 6·38 | 5·9 | 6·19 | 5·25 |
| 16 | 6 23 | 5·7 | 6·37 | 5·0 | 6·38 | 5·10 | 6·18 | 5 25 |
| 17 | 6 23 | 5·7 | 6 37 | 5·0 | 6·38 | 5·10 | 6·17 | 5·26 |
| 18 | 6·24 | 5 6 | 6·37 | 5·0 | 6·37 | 5·11 | 6 16 | 5·27 |
| 19 | 6·24 | 5·6 | 6·37 | 5·0 | 6 37 | 5·11 | 6·15 | 5·27 |
| 20 | 6·25 | 5·5 | 6·38 | 5·0 | 6 36 | 5·12 | 6 14 | 5·28 |
| 21 | 6·25 | 5·5 | 6·38 | 5·1 | 6 36 | 5·12 | 6·13 | 5·28 |
| 22 | 6·26 | 5·4 | 6·38 | 5·1 | 6·35 | 5·13 | 6 12 | 5 29 |
| 23 | 6·27 | 5 3 | 6·38 | 5·1 | 6·35 | 5 13 | 6·11 | 5·29 |
| 24 | 6·27 | 5 3 | 6·38 | 5·1 | 6 34 | 5·14 | 6·10 | 5·30 |
| 25 | 6·28 | 5·2 | 6 39 | 5·2 | 6 34 | 5·14 | 6·9 | 5·30 |
| 26 | 6·29 | 5 2 | 6 39 | 5·2 | 6·33 | 5 15 | 6·8 | 5·31 |
| 27 | 6·29 | 5·1 | 6 39 | 5·2 | 6·33 | 5·15 | 6·7 | 5·31 |
| 28 | 6·30 | 5 1 | 6·39 | 5·3 | 6·32 | 5·16 | 6·6 | 5·32 |
| 29 | 6·30 | 5·0 | 6·39 | 5 3 | 6 32 | 5·16 | 6·5 | 5·32 |
| 30 | 6 31 | 5·0 | 6·39 | 5·3 | 6·31 | 5·17 | 6·4 | 5·33 |
| 31 | 6 31 | 4·59 | ... | ... | 6·31 | 5·17 | 6·3 | 6·33 |

The times given are for the whole of Queensland, New South Wales, and Victoria, where the same Standard Time is observed.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 7 May | ○ | Full Moon | 12 | 43 | p.m. |
| 14 „ | ☽ | Last Quarter | 11 | 48 | a.m. |
| 21 „ | ● | New Moon | 10 | 47 | „ |
| 29 „ | ☾ | First Quarter | 9 | 33 | „ |

The Moon will be nearest the earth on the 14th, and at its farthest distance on the 28th.

| | | | | | |
|---|---|---|---|---|---|
| 5 June | ○ | Full Moon | 11 | 7 | p.m. |
| 12 „ | ☽ | Last Quarter | 4 | 38 | „ |
| 19 „ | ● | New Moon | 11 | 2 | „ |
| 28 „ | ☾ | First Quarter | 2 | 8 | a.m. |

The Moon will be nearest the earth on the 9th, and at its farthest distance on the 25th. It will cause a partial Eclipse of the Sun on the 19th. visible in the Arctic Regions but not in Australia.

| | | | | | |
|---|---|---|---|---|---|
| 5 July | ○ | Full Moon | 7 | 40 | a.m. |
| 11 „ | ☽ | Last Quarter | 10 | 12 | p.m. |
| 19 „ | ● | New Moon | 1 | 0 | „ |
| 27 „ | ☾ | First Quarter | 4 | 40 | „ |

The moon will be nearest the earth on the 7th and at its greatest distance on the 22nd. There will be a *Total Eclipse* of the *Moon* from 6·51 to 8·27 a.m. on the 5th; but only the moon's entrance into the shadow of the earth will be seen in Eastern Australia.

| | | | | | |
|---|---|---|---|---|---|
| 3 Aug. | ○ | Full Moon | 3 | 11 | p.m. |
| 10 „ | ☽ | Last Quarter | 5 | 56 | a.m. |
| 18 „ | ● | New Moon | 4 | 21 | „ |
| 26 „ | ☾ | First Quarter | 5 | 8 | „ |

The moon will be nearest the earth on the 4th, and at its greatest distance on the 18th.

* For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year

At Roma the times of sunrise and sunset during May, June, and July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

* These notes will not again be published until September, as they apply to the series from May to August.

# Farm and Garden Notes for July.

FIELD.—The month of July is generally considered the best time to sow lucerne, for the reason that the growth of weeds is then practically checked, and the young lucerne plants will, therefore, not be choked by them, as would be the case if planted later on in the spring. If the ground has been properly prepared by deep ploughing, cross-ploughing, and harrowing, and an occasional shower occurs to assist germination and growth, the lucerne will thrive so well that by the time weeds once more appear it will be well able to hold its own against them. From 10 to 12 lb. of seed will be sufficient for an acre. This is also the time to prepare the land for many field crops, such as potatoes, maize, oats, and barley for green fodder; also rye, vetches, tobacco, cotton, sugar-cane, field carrots, mangolds, swedes, canaigre, &c. Early potatoes, sugar-cane, and maize may be planted in very early districts, but it is risky to plant potatoes during this month in any districts liable to late frosts or in low-lying ground. Under such conditions it is far better to wait until well into the following month. The greatest loss in potatoes and sugar-cane has been, on more than one occasion, experienced in September, when heavy frosts occurred in low-lying districts in the Southern portion of the State. During suitable weather, rice may be sown in the North. The coffee crop should now be harvested, and yams and turmeric unearthed.

KITCHEN GARDEN.—Should showery weather be frequent during July, do not attempt to sow seeds on heavy land, as the latter will be liable to clog, and hence be injurious to the young plants as they come up. The soil should not be reworked until fine weather has lasted sufficiently long to make it friable. Never walk over the land during wet weather with a view to sowing. The soil cakes and hardens, and good results cannot then be expected. This want of judgment is the usual cause of hard things being said about the seedsman. In fine weather, get the ground ploughed or dug, and let it lie in the rough till required. If harrowed and pulverised before that time, the growth of weeds will be encouraged, and the soil is deprived of the sweetening influences of the sun, rain, air, and frost. Where the ground has been properly prepared, make full sowings of cabbage, carrot, broad beans,

lettuce, parsnips, beans, radishes, leeks, spring onions, beetroot, eschalots, salsify, &c. As westerly winds may be expected, plenty of hoeing and watering will be required to ensure good crops. Pinch the tops of broad beans which are in flower, and stake up peas which require support. Plant out rhubarb, asparagus, and artichokes. In warm districts it will be quite safe to sow cucumbers, marrows, squashes, and melons during the last week of the month. In colder localities it is better to wait till the middle or end of August. Get the ground ready for sowing French beans and other spring crops.

FLOWER GARDEN.—Winter work ought to be in an advanced state. The roses will now want looking after. They should already have been pruned, and now any shoots which have a tendency to grow in wrong directions should be rubbed off. Overhaul the ferneries, and top-dress with a mixture of sandy loam and leaf mould, staking up some plants and thinning out others. Treat all classes of plants in the same manner as the roses where undesirable shoots appear. All such work as trimming lawns, digging beds, pruning, and planting should now be got well in hand. Plant out antirrhinums, pansies, hollyhocks, verbenas, petunias, &c., which were lately sown. Sow zinnias, amaranthus, balsam, chrysanthemum tricolour, marigold, cosmos, coxcombs, phloxes, sweet peas, lupins, &c. Plant gladiolus, tuberoses, amaryllis, pancratium, ismene, crinums, belladonna, lily, and other bulbs. Put away dahlia roots in some warm, moist spot, where they will start gently and be ready for planting out in August and September.

# Orchard Notes for July.

## THE SOUTHERN COAST DISTRICTS.

The notes for the month of June apply to July as well. The first crop of strawberries will be ripening during the month, though extra early fruit is often obtained in June, and sometimes as early as May, under especially favourable conditions. Look out for leaf-blight, and spray for same with Bordeaux mixture, also watch for the first signs of the grey mould that attacks the fruit, and spray with the sulphied of

soda wash. The larvæ of the cockchafer, that eats the roots of strawberries, should be looked for, and destroyed whenever found. Pruning of citrus and other fruit trees may be continued; also, the spraying with lime and sulphur. Where the ringing borer, that either attacks the main trunk or the branches at or near where they form the head of the tree is present, the main stems and trunks should either be painted or sprayed with the lime and sulphur wash during the month, as the mature beetles that lay the eggs that eventually turn to the borers sometimes make their appearance during the month, and unless the trees are protected by the wash they lay their eggs, which hatch out in due course and do a lot of damage. Keep the orchard clean, so that when the spring growth takes place the trees may be in good condition. There is usually a heavy winter crop of pineapples ripening during this and the following months, particularly of smooth leaves. See that any conspicuous fruits are protected by a wisp of grass, as they are injured not only by frost but by cold westerly winds.

## THE TROPICAL COAST DISTRICTS.

See the instructions given for the month of June. Keep the orchards clean and well worked. Prune and spray where necessary.

## THE SOUTHERN AND CENTRAL TABLELANDS.

Where pruning of deciduous trees has not been completed, do so this month. It is not advisable to leave this work too late in the season, as the earlier the pruning is done after the sap is down the better the buds develop—both fruit buds and wood buds; thus securing a good blossoming and a good growth of wood the following spring.

Planting can be continued during the month; if possible, it should be finished this month, for though trees can be set out during August, if a dry spell comes they will suffer, when the earlier planted trees, which have had a longer time to become established, will do all right—provided, of course, that the land has been properly prepared prior to planting, and that it is kept in good order by systematic cultivation subsequent to planting.

Do not neglect to cut back hard when planting, as the failure to do so will result in a weakly growth.

As soon as the pruning is completed, the orchards should get their winter spraying with the sulphur limewash, and either with or without salt, as may be wished. See that this spraying is thoroughly carried

out, and that every part of the tree is reached, as it is the main treatment during the year for San José and other scale insects, as well as being the best time to spray for all kinds of canker, bark-rot, moss, lichens, &c.

Where the orchard has not been ploughed, get this done as soon as the pruning and spraying are through, so as to have the land in good order for the spring cultivations. See that the work is well done, and remember that the best way to provide against dry spells is to keep moisture in the soil once you have got it there and this can only be done by thorough and deep working of the soil.

When obtaining trees for planting, see that they are on good roots, and that they are free from all pests, as it is easier to prevent the introduction of pests of all sorts than to eradicate them once they have become established. Only select those varieties that are of proved merit in your district; do not plant every kind of tree that you see listed in a nurseryman's catalogue, as many of them are unsuited to our climate. The pruning of grape vines may be carried out in all parts of the tablelands other than the Stanthorpe district, where it is advisable to leave this work as long as possible, owing to the danger of spring frosts.

Where grape vines have been well started and properly pruned from year to year, this work is simple; but where the vines have become covered with long straggling spurs, and are generally very unsightly, the best plan is to cut them hard back, so as to cause them to throw out good strong shoots near the main stem. These shoots can be laid down in the place of the old wood in following seasons, and the whole bearing portion of the vine will be thus renewed.

Where vineyards have been pruned, the prunings should be gathered and burnt, and the land should receive a good ploughing.

# Queensland Agricultural College.

## FOR SALE.

Grass Roots, Rhodes and Paspalum, are obtainable at 2s. 6d. per sack, f.o.b. Gatton.

There are no farm seeds for disposal at the College.

## POULTRY.

The following breeds are available:—Brown Leghorn, White Leghorn, Indian Game, Black Orpington, Silver-Laced Wyandotte, Rhode Island Reds. In last-named breed, no birds will be available this year, and only a limited number of eggs at 21s. per setting f.o.b.

**Prices:**

Cockerels—10s., 15s., and 21s.
Pairs—Cockerel and Pullet, 30s. and 42s.
Trios—Cockerel and two Pullets, 42s. and 63s.
} f.o.b. Gatton.

Prices vary according to quality. Unless crates are returned promptly, an extra charge of 2s. for a single bird and 1s. for each additional bird will be incurred.

Settings of eggs of the above breeds are available from 1st July up to 30th November. Price, 10s. per setting, f.o.b. Gatton. Nine eggs in each setting guaranteed fertile. Should less than nine prove to be fertile, the infertiles will be replaced, if returned, carriage paid and unbroken.

(N.B.—An infertile egg is uniformly translucent when held up to a strong light. Settings should be allowed to settle twenty-four hours before being placed under the hen.)

**IMPORTED HOLSTEIN BULL**—Froxfield Dairyman (12611). Calved 26th March, 1912. Sire, Froxfield Duke Bob (155). Dam, Froxfield Doris (1150). Bred by J. F. N. Baxendale.

**Jersey Bulls.**

All cattle sold accompanied by pedigree.

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CLYDESDALE STALLION—**Lord Cellus** (imp.).
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**Stewart of Wanora.**

JERSEY BULLS—**Star Turn** (imp.).
Service fee, 10s. per cow; agistment, 1s. per week.

CUTHBERT POTTS, Principal.

*The Proprietor of Australian Patent No. 12663, dated 30th March, 1914, for Improvements in Harrows will dispose of the whole or part interest in the Patent or grant licenses on Royalty, and invites tenders in respect of same in order to fulfil the full requirements of the trade and the public. Address inquiries to* ***Phillips, Ormonde (Inc.) Pty. Ltd.,*** *Patent Attorneys and Consulting Engineers, 17 Queen Street, Melbourne, where drawings and specifications may be obtained.*



# THE

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# Agriculture.

## CO-OPERATION FOR FARMERS.

Some years ago, at an agricultural conference held at Warwick, Mr. C. P. Mau read a paper on "Co-operation and how to make use of it." It may be well to consider his arguments in favour of co-operation in these times of high prices for food, machinery, stock, &c.—the result of the war and of the high wages demanded by workers in all branches of industry, rural and urban. Mr. Mau said:—

"Co-operation is the uniting together of a number of individuals for the purpose of obtaining food or other supplies at the cheapest rates. There are several uses to which co-operation may be applied, namely:—1st, for the purpose of distribution; 2nd, for a number of men to buy from the middleman; 3rd, to buy directly from the factory or wholesale houses. Most people do not realise these principles unless they have a fall-out with their storekeeper. Now, in my opinion, that is wrong. Co-operation should be used particularly amongst small farmers, to enable them to get their supplies as cheaply—that is, at the same rate—as the large estate holders who are able to buy at wholesale prices.

"Or take the middleman, for instance. What does he do? He buys wholesale for the simple reason that he can get his goods cheap. Therefore, when farmers from year to year notice how the big estates and tradesmen buy wholesale, should they not co-operate to follow their example rather than raise a cry out against the fat man as usual?

"We must take a pattern from him how to do the business.

"I will refer you to the three methods before mentioned:—

"First.—To start without a fixed capital we should organise as strong a body of farmers as possible. They must, in fact, all and each one, form a group to buy their supplies at one place. Tenders must be called for periodically to get quotations. Then it is as plain as daylight that the small farmers will be able to buy at wholesale prices as well as the tradesman. In fact, it strikes me that the co-operative farmers might get a tradesman to quote goods as cheaply as if they appointed their own agent to buy.

"Second.—The group of farmers united together as above should register themselves as a limited liability company for the purpose of buying their own stores, and subscribe among themselves sufficient to buy, say, one month's supply. Suppose the group to consist of fifty members, and that each member, on an average, would require £5 worth of goods for the month. This would amount to a total expenditure of £250 on the first order. At this stage it will be necessary to appoint from amongst the group, if possible, a reliable business man to act as buyer and salesman for the company, and to him must be handed over the sum subscribed to buy goods wherever he best can in the cheapest market. The goods, on delivery, must be kept together in a warehouse or a shed, and thence distributed to the members of the society when needed. A strict account must be kept of the goods delivered to members, and the amount of their value must be handed to the salesman to keep his stock of goods up to the same standard as at the beginning. New members can join at any time, when approved of by the company, by handing to the salesman the sum of money required to buy the goods they are in need of.

"It goes without saying that the more members the greater the success. I wish to point out that a co-operative company on the above lines cannot fail, because we should not be dependent on customers. We buy our own goods and make our own profits, and each member will get his or her share of the profit proportionate to the money they had spent by getting their goods at wholesale prices. I will remark that no one is able to undersell a company established on the above lines, for this reason: If our salesman discovers that a firm is quoting below his company he can at once go and buy from that firm, and so be able to compete favourably.

"Should the business of the company increase to such an extent that the members should deem it advisable to start business with the public, nothing is simpler than to merge the contributions of members into a working capital, one share being given for each £1 subscribed standing to his or her credit.

"Then a co-operative store can be run on similar lines to others.

"I feel sure that my first, second, and third methods will do to work upon at first—to commence the system and to work it up thoroughly before launching out into a public co-operative association. We must

remember that to start a co-operative company requires large capital, which is not easy to get together for a lot of hard-struggling farmers. So it is well not to try to walk before we can crawl—a man must be a boy before he becomes a man. Therefore, even 100 poor farmers will not make a capitalist. Hence, oftentimes co-operation goes down to ridicule, and is sneered at by its opponents.

"In conclusion, I will point out that agency companies established all over the State on the above method will enable the producer to be brought into direct contact with the consumer, and thereby get full value for his product. At the same time the consumer will get full value for his money. The system in vogue at present of letting all goods go through three or four agents, and finally the storekeeper, is what makes the small farmers suffer both in the North and South.

"Southern farmers produce everything in the way of produce that the Northern canegrower is in want of. I ask, in the name of the farmers I represent, shall we farmers South and North not make up our minds at last and put our shoulders to the wheel to do our business on the lines I have at least tried to explain to you for the good of the farmers? By doing so we shall make the farmers both North and South greatly better their condition, each being able to buy his requirements more cheaply and sell his produce at a better price; the latter, because the agency and other profits have not to come between the buyer and the seller. I can speak from personal experience of the benefits of co-operative buying on a small scale. Let us endeavour to apply throughout the length and breadth of Queensland a principle which is capable of bringing many benefits to our door, and eliminating a growing evil in trade which is filling our cities, depleting our farming districts, and adding nothing to the wealth or welfare of the State."

We might emphasise Mr. Mau's proposals by asking: If the Military, Naval, and Civil Services can support large stores that supply their members all over the country with "cheap" articles, why cannot farmers organise and support a movement which will benefit them in a similar manner? Why should they not join hands and pay a moderate annual subscription to an organisation of their own, and thus be able to purchase all their supplies on special terms through the duly-appointed trade agents of the society?

No capital to set up store-keeping would be required, as good terms could be made with agents.

In connection with co-operation and dairying, Mr. R. R. Kerr, Dairy Supervisor, Victoria, writes as follows in the "Journal of Agriculture" (10th May) on—

## "CO-OPERATIVE OWNERSHIP OF BULLS.

"Of the many useful ways that co-operation could benefit the farmer, nothing would be more important than the principle applied to the buying and use of dairy sires. In all closer settlement dairying areas

the herds are on the small side, numbering 10, 12, or 20 odd cows. The keeping of a sire for so few a number of cows is not the best business arrangement, putting the farmer to unnecessary cost both in the buying and keeping of the bull.

"These small farms are generally handy one to the other. Can any strong argument be raised against one farmer caring for the bull and the neighbours bringing their cows across for service? Surely the neighbourly spirit is existing to that extent. The system advocated would be for three or four farmers to combine or co-operate and buy a good animal, and arrange between themselves as to whether one of the number should be paid for keeping the bull or whether each should care for him in turn. The price of a good sire from a tested dam with a 400-lb. fat record, although a splendid investment, has one deterrent in that it is an outlay of cash that the small farmer can ill afford, because he has to wait three years to get the benefit of his investment. One bull judiciously used can serve at least 50 cows. If £30 or £40 were divided between three or four farmers, the share of each would be £10—the price of the mongrel sire now so prominent. Were such a scheme adopted, its benefits would be manifold.

"The resultant progeny would have a much higher market value, and the returns from the increased yields would many times pay for the original investment.

"The improvement of herd yields is of national importance, considering the wealth of the dairying industry; and to the mind of the writer the selection of dairy sires is of equal importance to the industry as the certification of stallions to the horse breeders.

"Bulls from dams yielding 400 lb. fat are being slaughtered simply because dairymen do not know their value and refuse to give the few extra pounds asked for them. They are content to plod along using the mongrel sire, or, nearly as bad, the pure sire from a worthless dam, raising useless stock—living monuments to such limited intelligence. The purebred sire will always demonstrate his right to be called the foundation of the dairy industry.

"Too many who start in the business of breeding purebred animals become discouraged, because they do not reap handsome profits during the first two or three years. It is often a long journey from beginning in the breeding of purebred live stock to the position of a leader whose produce is in demand at high prices. Ten years is but a short time when it comes to establishing and making known a reputation as a real constructive and honest breeder, no matter in what line one may be engaged. Twenty years or more is often required to attain the fullness of confidence and recognition on the part of buyers of pure stock. It takes years to build up the good-will that goes with profit-making in any business where public confidence is an asset, and the breeding of live stock is no exception. If you feel that you have made a wise choice in the line of breeding you have selected, stay by your chosen breed. It will pay in the end. The in-and-out policy is neither constructive nor profitable."

## THE VALUE OF POTASH IN AGRICULTURE.

In March, 1917, at the fourteenth ordinary meeting of the Royal Society of Arts, London, Dr. J. A. Voelcker, Ph.D., F.I.C., read a most interesting paper on "Fertilisers and their Supply in War Time." He dealt mainly with the points at issue, such as—What are the present conditions of supply, what are the needs, and how can these be best provided for?

"The most common of all fertilisers," he said, "is, of course, farmyard manure, comprising in itself the three constituents—phosphoric acid, nitrogen, and potash. The supply of it is, however, a regularly decreasing one, and the great rise in the price of feeding stuffs experienced since the war began made it increasingly expensive to produce. As a consequence, dependence will more and more have to be placed on artificial fertilisers.

"PHOSPHORIC ACID.

"Fertilisers that mainly supply phosphoric acid are superphosphate, basic slag, and ground phosphates.

"NITROGEN.

"Of two sources of nitrogen—nitrate of soda and sulphate of ammonia—the former is, to all intents, no longer available for agricultural purposes. Added to the difficulties of shipment—it all coming from the west coast of South America—is the fact that it is all required in connection with the manufacture of explosives, either directly or for making the all-essential nitric acid. When procurable at all, its price is £21 to £22 per ton, which, compared with sulphate of ammonia, now at £16 per ton, and containing one-third more nitrogen per ton, puts it 'out of court.' As between the two sources of nitrogen, it may be said generally that, though nitrate of soda was perhaps the favourite one with farmers, they will suffer little or nothing by the change. The superiority of one or the other is mainly a matter of season and price, and, to some lesser degree, of the land and the crop. Sulphate of ammonia is a few days slower in its action, but is preferable on clay land, just as nitrate of soda is to be chosen for chalk soils. Sulphate of ammonia is less readily washed out, and so does better in a wet season, and nitrate of soda in a dry. For potatoes and sugar-cane, sulphate of ammonia is to be preferred; for a hay crop, nitrate of soda. But the differences between their action are not such as to interpose any real difficulty now that only sulphate of ammonia is obtainable.

"POTASH.

"Lastly comes the consideration of potash-supplying materials, and these need not detain us long, for it is well known that, since the products of the Stassfurt mines ceased to come here, agriculturists have practically had to do without potash. Much has been said and written about the providing of a substitute for these salts; but, though seaweed, the ashes of hedge-clippings, bracken and other materials have been named, none of them have, except under quite local conditions, taken actual

shape. Still, from time to time, materials are brought forward that supply potash, though, so far, none of them exist in any great quantity. The refuse from beet-sugar purification, the 'argol' (tartrate of potash) obtained in the fermentation of wine, and the sweepings of flues in works where iron and manganese ores have been smelted, are all utilised so far as they go. The last-named material has about the same amount of potash that kainit contains (10 to 15 per cent.), the potash being present partly as sulphate and partly as carbonate. It would not appear, however, that the quantity of this available exceeds 3,000 tons annually. The present price is £7 to £9 per ton, or 7s. 6d. per unit per ton of sulphate of potash. For some time there has been talk of extensive deposits of potash salts in Catalonia (north of Spain), but nothing has so far been done to develop these. Indeed, I have heard it hinted that, previous to the war, the Stassfurt people were interesting themselves in the development of this source.

"Yet another supply has been heard of in potash salts of high quality, obtained by somewhat difficult refining, from districts bordering the Red Sea. These are sold on a basis of 80 per cent. sulphate of potash, and of them about 6,000 tons annually are said to be available. Peruvian guano, as already observed, contains some amount of potash, and so may acquire a special value at this time. The review of these supplies, and the fact that we are at the present time going on with our agriculture without renewing the potash supply, naturally raises the doubt as to whether the oft-preached doctrine of potash for crops has not been 'overdone.' Certain it is that the land is not yet suffering a potash starvation, and when I look at the Rothamsted records in the case of heavy land, and my own on light land (though carried out for a much briefer period), I confess that I fail to see the clear evidence of potash being as urgently required as has been put forward. No doubt there are certain crops—such as potatoes, mangels, clover, fruit, hops, &c.—which benefit largely from the application of potash; but if farmyard manure can be supplied in sufficiency it will probably give all the potash that is wanted, while for ordinary corn crops—such as wheat, barley, and oats—it is very questionable if potash is required under ordinary circumstances and in rotation-cropping. Indeed, I confess that I am beginning to wonder whether, just as with basic slag and the 'citrate solubility,' the need of potash for crop-growing has not, to a great extent, been the outcome of an enterprising 'trade policy' rather than a truth founded on actual facts of science and practice.

"However that be, I must say that I regard far less seriously than I did at first the shortage of potash salts so far as agriculture is concerned."

During the discussion which followed the reading of Dr. Voelcker's paper, Mr. J. W. Hughes said he agreed with the author that the value of potash had been over-estimated, as he knew of land which had received no potash dressing for twenty years, or farmyard manure or potash-containing manure of any kind, which had yet grown splendid crops of some kinds of vegetables, provided that it was supplied with nitrogen and phosphates. As regards potatoes, the non-application of 1 cwt. of

sulphate of potash had made, in twenty consecutive years, an average difference of 1 or 2 tons of potatoes an acre. Potash salts were useful in the case of potatoes, and when they could not be obtained, farmyard manure should be used, and withheld from such things as turnips and wheat which did not need it.

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## A NEW MAIZE SECRET.

Reports to hand by the last American mail announce an interesting development in maize-growing experiments. Certain tests have been conducted by officers of the School of Agriculture of the University of Minnesota. If future tests sustain the present indications, every bushel of maize planted may be made to send up more sprouts, and these sprouts may grow so fast that several weeks may be gained in the maturing time of the corn. Scientists at the Minnesota University Farm believe that they have discovered, quite by accident, a commercially practicable method of increasing the germination rate of seed maize. It came about in experimenting with various insecticides to be used in treating grains.

Professor Wm. Moore, of the Entomology Department, and Professor H. K. Hayes, of the Agronomy Department, have been working on fumigation processes for killing grain parasites. It is important that germination qualities of grain treated should not be impaired in fumigating, so they regularly checked plantings of the untreated. It was in connection with the use of nitro benzine that they bumped into the unexpected. They found that not only was the grain not impaired for seed purposes, but that it was actually bettered. Maize seemed to thrive on the fumes of nitro benzine. Not only was the percentage of germination increased by treatment, but the rate of germination also was speeded up. The experimenters checked and rechecked, again and again, with the same results. An experiment with 1911 maize, for instance, brought out the fact that the fumigated seeds sprouted nearly two days before the unfumigated when planted at the same time, and of the former about 18 per cent. more kernels germinated than of the latter.

"We are not saying that the treatment will so result with all corn," Professor Moore said, "as our experiments have not gone far enough to justify so sweeping a statement, but we expect to wind up the most significant test of all on the subject shortly, after which we shall have something to announce. Nitro benzine is an oil, a coal tar derivative. Its price has been raised somewhat by war causes, but it is commercially obtainable. We fumigate the corn by placing it in a closed box in which is suspended a cloth saturated with the oil. The fumes do the work. We think well enough of present indications to make known our findings at this time, so that American farmers who are facing a critical seed maize situation may try out the process if they see fit. Why does the treatment so affect the corn? We haven't the slightest idea. We only know that it has had that effect with corn we have treated."—"Producers' Review."

## PRESERVING MAIZE IN TANKS.

When maize is about to be tanked, it is essential that the grain be thoroughly dry. Exposure to the sun beforehand of what may appear to be a dry sample is recommended. The tank itself should be dried by lowering a can containing red hot coals into it before putting in the maize. The secret of preserving maize in tanks when they are not properly filled is to exhaust the oxygen by placing a lighted candle above the maize, and hermetically sealing the tank. Should it be found necessary to fumigate at any time for the prevention of weevil, all that is necessary is to open the tank and treat the grain with bisulphide of carbon. The usual dose is 1½ to 3 lb. of bi-sulphide to every 100 bushels of grain, according to the tightness of the tank. The liquid is either poured into saucers or on to cotton waste placed in dishes put on top of the grain to be treated. The lid is then tightly fitted on and made air-tight. Twenty-four hours is quite long enough to allow the tank to remain unopened—that is, if the grain is required for seed purposes. Care must be exercised not to place a light or to smoke near the fumes of the bi-sulphide, as the substance explodes very readily. After 24 hours the tank should be opened at top and bottom to allow the fumes to escape; hence some opening should be provided at the bottom which can be hermetically closed.

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## SUN HEAT FOR KILLING WEEVILS IN MAIZE AND WHEAT.

Investigations have been conducted in Great Britain and South Africa as to the effect of high temperature on maize or wheat weevils. At Salisbury, in Rhodesia, a sail was spread out on the ground, and a sample of wheat heavily infested with weevils spread over it. The temperature on the sail was 116 degrees Fahr. When the wheat touched the hot sail, many weevils flew away; the remaining ones died in a few minutes. A sample of the weevilly wheat from the sail was then placed in a jar, and nearly six months later no more weevils had bred out. The exposure to the sun heat had evidently killed the weevils in all stages—eggs, larvæ, and perfect fly. Subsequent experiments proved that 115 degrees Fahr. was the desirable minimum. Similar results have been obtained at Grafton Experiment Farm, and this simple method of ridding grain of weevils can be confidently recommended to farmers. A black tarpaulin will be found to absorb more heat than a white one.—"Town and Country Journal."

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## COTTON-GROWING IN NEW MEXICO, U.S.A.

The cotton-growing districts of all tropical and sub-tropical zones are comprised between the parallels of 36 degrees north and 36 degrees south of the Equator. The territory of New Mexico lies between the parallels of 32 and 37 degrees north latitude, and is consequently well within the cotton belt of the United States. Lately, experiments were made there in cotton-growing, which resulted in proving that the

territory was eminently adapted to cotton production. In the trials cotton was planted in rows 40 inches apart at the rate of 20 lb. of seed to the acre. A bushel of seed contains 120,000 to 150,000 seeds. This quantity is enough, if all seeds germinate, to plant 15 acres. Generally, however, from three-quarters to one and a-half bushels are planted per acre. Taking a bale of cotton at 400 lb., the yield was:—Of Burnett's Cotton, 1·47 bales of lint per acre; Durango, 1·46 bales; Allen's Imperial Triumph, 1·37 bales. Generally a crop of 1,000 lb. of seed cotton will give 400 lb. of lint. The result of this trial shows that the yield of seed cotton was 1,500 lb. per acre; and 600 lb. lint, worth 10d. per lb., gave a return of £25 per acre. The whole of the cotton-growing area of Queensland extends from 29 degrees south to 10 degrees south latitude; and is, therefore, well adapted to cotton-growing.

# MARKET GARDENING.

## HERB-GROWING.

Previous to the war, culinary herbs were mainly imported from Europe, especially from France. That source of supply being cut off, buyers of herbs on a wholesale scale in Australia are looking to the States of the Commonwealth to supply the deficiency. The climate of Southern Queensland, especially on the coastal ranges, is eminently adapted to the successful cultivation of herbs. In districts where cost of carriage precludes the possibility of ordinary heavy crops being profitably produced, the herb industry particularly recommends itself to farmers on account of the smallness in bulk of its products when compared value for value with other products—such as hay, chaff, maize, potatoes, &c.

Herbs are generally easy to grow from seed. If plants can be obtained, so much the better. They may be sown or planted out at any time between April and August. Where plants are not obtainable, the seed should be sown in rows drawn 1 foot apart, just deep enough to cover the seed. When the plants are up, they must be thinned out to 1 foot apart. During the summer, they must be well watered, the surface of the soil being kept loose and mulched. In autumn or early spring, to extend the area, take up and divide some roots, planting them 18 inches apart. New plantings should be made every winter, in order to supply the places of any that may have died out during the summer.

### A MARKET FOR HERBS.

The most useful herbs, and in greatest demand commercially, are:—Marjoram, Sage, and Thyme; and with reference to the wholesale prices for these, the Department of Agriculture and Stock has received from Messrs. Loughland, Mackay, and Co., Australasia, Ltd., 235 Edward street, Brisbane, a letter in reply to an inquiry from the Department on the subject.

The above firm are desirous of purchasing the herbs named in considerable quantities, provided a decent sample can be offered, the buyers paying cash on delivery. At present supplies of such herbs cannot be obtained from Europe; hence an undoubtedly good opportunity is afforded to farmers and others in Southern Queensland to produce Australia's requirements in this line.

The firm quote prices which they paid in the past for rubbed, dried herbs, such as Marjoram, Thyme, and Sage, as follows:—

Marjoram, 50s. 9d. per cwt.; Thyme, 23s. 6d. per cwt.; Sage, 29s. 6d. per cwt. These prices are c.i.f. Australian ports. To them would have to be added local landing charges—about 10s. per ton of 40 cubic feet, and duty at the rate of 4d. per lb.—bringing the actual price of the imported article to 88s. per cwt. for Marjoram, 60s. 9d. for Thyme, and 66s. 9d. for Sage. The main difficulty would be the picking; but this could easily be done by female labour, as it is fairly light work.

## THE CULTIVATION OF CULINARY HERBS.

SAGE.—Sage grows well in parts of Queensland, but does not like much heat. On the high coastal lands—as at Toowoomba, Warwick, Stanthorpe in the South-West, and Herberton in the North—it thrives well. It is easily propagated by cuttings, and, if planted about 15 to 18 inches apart each way, will soon cover the ground and keep down weeds. The dried leaves find a ready sale. According to the labour available, the plants may be hand-stripped, or cuttings may be made two or three times a year.

THYME.—Unlike the Sage plant, Thyme is able to stand a good deal of heat. It requires the same treatment in planting as Sage. Along with other culinary herbs, it is largely imported in a dry state for flavouring purposes, being very largely used in the butchering trade.

MARJORAM.—Plants may be raised from cuttings planted, say, in April if the weather be mild; but a better plan is to divide old plants into as many single-stemmed plants with a root or two as possible. These should be planted in well-worked ground at distances of 18 to 20 inches apart each way. A couple of chippings with the hand cultivator will be all that is necessary to keep down weeds, as the plants soon cover the ground. Two or three cuttings may be made every year. There is a very considerable demand for the dried leaves. As in the case of Thyme and Sage, Marjoram requires a deep, friable, loamy soil and a temperate climate, under which conditions it will grow to a height of 18 inches.

The leaves of herbs must not be dried in the sun or near a fire.

## HERB-GROWING FOR WOMEN.

"Before the war Australia imported annually £10,000 worth of culinary herbs." What a staggering piece of information is this, given us in a bright and practical article, by Miss Annie S. Evans, in a Melbourne newspaper recently. With all our natural advantages and opportunities for growing herbs, to think that we have been importing them at this rate. We have no excuse but ignorance and indolence. Some of us are ignorant, some are indolent, some are both.

When the continental market was closed and the shortage began to assume serious proportions, and the demand became greater than the supply, we knew for the first time where we obtained our herbs. Not only Germany, but France, Italy, and the Balkans, supplied us.

One man—"out Ballarat way"—Mr. George Morgan, evidently is one of the few who has not suffered from the prevailing indolence, because for the last thirty years he has been a herb farmer. He has 16 acres under cultivation, which, we believe, is the largest farm of the kind in Australia. This year one firm alone is prepared to take his whole harvest. So here is an opportunity for the woman on the land!

This successful grower informed his interviewer that women could easily make a livelihood with herb-growing. But they must begin in a small way if they want to be successful growers. He suggests 100 cuttings as enough to start with, which can be added to every year. The first year's crop will be probaly small, but the crop will increase every year. June or July are the months for planting in Victoria, and the best aspect is an eastern one. A clay or sandy soil the herbs flourish in, but a moist soil is also good. The land should be twice ploughed, then harrowed, the cuttings then put in fairly far apart, and set in a square formation.

The crop is cut when in flower, which is about November, and the cutting should be done with a hand sickle used close to the ground. Every leaf is used, even the sifting; there is no waste whatever. A hoe, a sickle, flail, and a few baskets are the only necessary requirements.

In taking slips they should always be cut, never broken.

Marjoram, Thyme, and Sage are particularly referred to here, for which there is always a large demand by merchants and butchers. Sage is the most expensive, and as the new leaf is best a fresh supply should be sent out every season.

A very comforting assurance is given that no animal, mice, or rabbits will touch the herbs, nor does any pest molest them. Sheep will carefully graze among the herbs without touching them.

We hope that some of our women readers will be diligent enough to give herb-growing a trial, and shall be glad to hear of their success.—"Weigel's Journal."

## GROWING MUSHROOMS.

Growing mushrooms in the open is one of the simplest forms of market-gardening. All that has to be done is to prepare the bed, "spawn" it; and in due course—namely, in Autumn—the mushrooms will appear. Beds should be prepared in time to admit of a crop appearing at the most suitable time. Mushrooms really grow all the year round, and may be gathered in quantities in the Spring season. The spawn is obtained from the parent plant, and much resembles a cobweb. This is preserved in bricks made of a mixture of turf and manure, and will keep for a long time in this condition. At the same time, mushrooms may be produced spontaneously from a bed of manure and earth properly prepared. Without spawn or seed of any kind, if the work is properly done, after a few weeks the mushroom will spring up from a bed of this kind, and will continue to appear for a month or six weeks. The crop, however, exhausts the bed, and preserved spawn must then be introduced.

### PREPARING THE BED.

During January or February a quantity of horse droppings should be procured and spread out thinly under a shed till needed. Dig trenches, 1 foot deep and 4 feet wide, and into these throw the droppings to a depth of 9 inches. Ram or tread this down firmly to exclude the air as much as possible, thus preventing the droppings from overheating too much. Now (if spawn is used) break up the spawn bricks into pieces the size of a marble, and set them 1 foot apart, almost on the surface of the manure. If no rain should come, give the beds a fair sprinkling of water, and a few days afterwards cover the manure and spawn with 3 inches of fine soil. As heavy rains frequently occur in February, it is well to provide some shelter for the beds, as too much water is injurious to the spawn. If the weather is suitable, and the temperature of the bed range from 60 to 70 degrees Fahr., within a month or even less, after covering up the spawn with earth, tiny white buttons spring up at intervals all over the bed. These buttons rapidly develop into mushrooms, and in about from ten days to a fortnight are large enough to cut for the market.

### RAISING MUSHROOMS WITHOUT SPAWN.

The manure must be well mixed with earth (or earth may be dispensed with) and laid down in a bed about 2 feet high and rammed or trodden down firmly, being slightly watered. In a few weeks the mushrooms will spring from a bed of this kind. A good shelter for it may be made out of half an old galvanised iron tank preferably enclosed with palings to exclude too much light. In France mushrooms are largely grown in tunnels and dark cellars; and when it is necessary to water the beds, the floor and walls are watered, not the bed.

## PROTECTING CABBAGES AND RELATED VEGETABLES FROM ATTACKS OF THE CABBAGE ROOT FLY.*

The cabbage root fly is a pest which is widely spread over Europe, the United States, Canada, and other countries. The "Journal of the Board of Agriculture," London, for 17th March last, describes the fly as an ashen grey-coloured insect, not unlike the house-fly in general appearance, and measures about ¼-inch in length. The winter is passed in the pupa stage, and the first brood of flies appears in April or the beginning of May. There are most probably three generations in the year. The eggs are visible to the naked eye, and are laid close to or on the plant, usually just below the surface of the soil. The larvæ are typical fly maggots, of white or pale yellowish colour, and measure about ¼-inch in length when full grown. They commence injury by gnawing the outer layers of the young roots, afterwards making tunnels inside the main root; they may also invade the lower part of the stem. The pupæ are about ⅓-inch long, oval in form, of a light or dark-brown colour, and are found in the soil close to the plants.

As the result of the attacks of the maggots of this insect, growth of the affected plants is checked, the leaves flag and become discoloured, the roots are largely destroyed, and the plants die.

Many remedies have been suggested either for destroying the maggots or for preventing the fly from depositing her eggs near the plants. With very few exceptions, none of the known measures can be recommended as being sufficiently practical and efficient to merit adoption. In a recently-issued article on this insect, Gibson and Treherne† record having experimented with forty-eight different methods of treatment for combating this pest. They conclude, however, with the statement that the only protection to be relied upon in the case of cabbages and cauliflowers is the use of tarred felt paper discs.‡ Professor Goff,§ of Wisconsin, was the first to adopt these discs or protectors, and found them to be thoroughly reliable and practical. His method soon became widely adopted in North America, where the discs have been frequently tested on a large scale, with favourable results. In the British Isles the discs have never received the attention which they undoubtedly merit. Reports on their use are extremely few, and they have not previously been subjected to any exhaustive trials.

During the past season a series of critical experiments has been carried out in several localities, under the writer's direction. The most important trials were those undertaken by Mr. J. T. Wadsworth,‖ Research Assistant in the Department of Agricultural Entomology, Manchester University. These trials were conducted at Northenden (Cheshire) on land which was known to be heavily infested by the root

* The illustrations accompanying the article were from photographs reproduced in the "Journal of the Board of Agriculture" by permission of the editor of "The Annals of Applied Biology."

† "Bulletin 12, Dominion of Canada Dept. of Agric., Entom. Branch, 1916."

‡ These "discs" are really square-cut.

§ "8th Annual Report, Exp. Sta., Univ. of Wisconsin, 1891," pp. 169-173.

‖ For a full account of these experiments, *vide* J. T. Wadsworth, "Annals of Applied Biology," Vol. III., No. 2, 1917.

fly. They were made on both cabbages and cauliflowers grown on well-manured soil. Some 816 cabbages (Leeds Market variety) were planted out on 1st May, and the discs placed in position on the following day. The latter were obtained from America, and are 2½ inches square. Each is provided with a slit extending to a point ½-inch beyond the centre of the disc, and a shorter slit crosses it at right angles in the centre of the disc (Fig. 1).

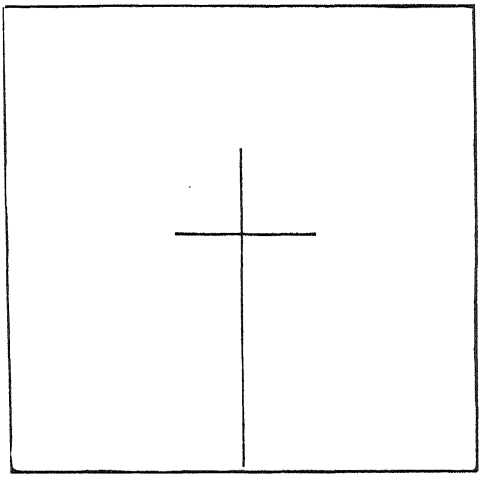


FIG. 1.—OUTLINE FIGURE OF A DISC; ACTUAL SIZE.

In order to obtain good results, it is desirable that the soil should be in a friable condition to enable the discs to be placed quite flat on the ground. They must be placed round the stems of the plants as soon as possible after the latter are planted out in the field (Fig. 2). Failure

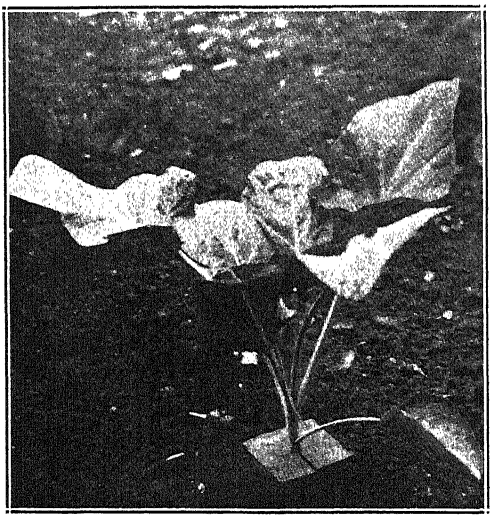


FIG. 2.—PHOTOGRAPH OF A BRUSSELS SPROUT PLANT SHOWING DISC IN POSITION.

to take this precaution often results in the plants becoming infested prior to the discs being applied, and the value of the latter is then lost. In the case of vegetables planted out earlier than May, this precaution is not so urgent, but the date of appearance of the flies varies according to the prevailing climatic conditions, and the location of the particular district concerned.

The main function of the disc is to act as a mechanical device to prevent the flies from laying their eggs in the usual position, close round the plants. It is, furthermore, important to keep the surface of the discs free from soil; otherwise the insect will deposit its eggs thereon, and the young maggots will readily gain access to the protected plants. Of the 816 plants used in Mr. Wadsworth's experiments, half were provided with the discs, and the remainder left unprotected. Only one plant was lost out of the 408 protected plants, while 54 of the untreated cabbages were severely attacked. With regard to cauliflowers, the results were even more striking; 932 plants were utilised, and, similarly, half of these were protected and the remainder left unshielded as controls. Only 24 of the protected plants were lost as compared with 294 of the unprotected plants.

In addition to experiments by Mr. Wadsworth, three market-gardeners undertook small scale trials. Full instructions were given in each case as to the method of application and the use of the discs. One grower, at Chorlton-cum-Hardy (near Manchester), who was supplied with 100 of the discs, reported that no case of root-maggot attack was noted where they were used, and that so far as his observation went they were successful. Another grower, at Prestwich (Cheshire), wrote that he had applied the discs to 50 cabbages, and, out of those, only 2 were attacked. Of 50 control plants most were infested. The third observer (at Nottingham) applied 100 of the discs, and reported that out of 84 protected cauliflowers only 5 were apparently attacked, and none were lost. Of 20 unprotected plants, 12 survived. He also experimented with 36 Brussels sprouts, 6 of which were provided with the discs. These all produced strong healthy plants, while all the unprotected ones were affected, 5 being completely destroyed.

Growers of cauliflowers and related vegetables are strongly advised to give these discs a fair trial. Their application is extremely simple, and can, if necessary, be undertaken by children. If they are placed carefully on the plants, no further attention, as a rule, is necessary. Once the plants have made good growth they have been tided over the most vulnerable period, and the soil can be earthed up over the discs, as the latter are then no longer necessary. The use of the discs is not the only measure advisable. The custom of cutting the vegetables and leaving the stumps to decay should be discontinued. The plants should be uprooted straight away in infested lands, as their stumps only serve as breeding places for fresh broods of maggots.

Arrangements have been made for the discs to be manufactured and sold at 1s. per 100, or 8s. per 1,000. The address of the maker may be obtained on application to The Secretary, Board of Agriculture and Fisheries, Whitehall Place, London, S.W.

# Pastoral.

## BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| P. Young .. .. | Talgai West, Ellinthorp | 2 | 42 | Milking Shorthorn Herd Book of Queensland |
| L. H. Paten .. .. | "Jeyendel," Calvert, S. & W. Line | 8 | 21 | Ayrshire Herd Book of Queensland |
| F. C. G. Gratton .. | "Towleston," Kingsthorpe | 2 | 14 | Holstein Cattle Club Herd Book |
| T. Mullen .. .. | "Norwood," Chelmer | 3 | 20 | Queensland Jersey Herd Book |
| J. H. Paten .. .. | Yandina .. .. | 6 | 21 | Ayrshire Herd Book of Queensland |
| Queensland Agricultural College | Gatton .. .. | 2 | 6 | Ayrshire Herd Book of Queensland |
| | | 2 | 3 | Holstein-Friesian Herd Book of Australia |
| | | 3 | 13 | Jersey Herd Book of Queensland |
| J W. Paten .. .. | Wanora, Ipswich .. | 10 | 42 | Ayrshire Herd Book of Queensland |
| M. W. Doyle .. .. | Moggill .. .. | 4 | 12 | Queensland Jersey Herd Book |
| G. A. Buss .. .. | Bundaberg .. .. | 1 | 15 | Herd Book of the Jersey Cattle Society of Queensland |
| W. Rudd .. .. | Christmas Creek, Beaudesert | 2 | 10 | Milking Shorthorn Herd Book of Queensland |
| M. F. and R. C. Ramsay | Talgai, Clifton .. | 5 | 27 | Herd Book of the Jersey Cattle Society of Queensland |
| George Newman .. | Wyreema .. .. | 9 | 37 | Holstein-Friesian Herd Book of Australia |

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| R. Conochie .. .. | Brooklands, Tingoora | 9 | 21 | Queensland Jersey Herd Book |
| W. J. Barnes .. .. | Cedar Grove .. | 10 | 37 | Queensland Jersey Herd Book |
| T. B. Murray-Prior .. | Maroon, Boonah .. | 2 | 37 | Queensland Shorthorn and Australian Herd Books |
| W. J. Affleck .. .. | Grasmere, N. Pine .. | 6 | 31 | Queensland Jersey Herd Book |
| A. J. McConnel .. | Dugandan, Boonah | 19 | 36 | Australian Hereford Herd Book |
| A. Pickels .. .. | Blackland's Stud Farm, Wondai | 4 | 62 | Illawarra Dairy Cattle Herd Book of Queensland |
| G. C. Clark .. .. | East Talgai, Ellinthorp | 3 | 7 | New Zealand Herd Book |
| H. D. B. Cox .. .. | Sydney (entered brother's name) | 3 | 16 | Commonwealth Standard Jersey Herd Book |
| J. T. Perrett and Son | Coolabunia .. .. | 2 | 36 | Illawarra Herd Book of Queensland |
| State Farm .. .. | Kairi .. .. | 4 | 8 | Ayrshire Herd Book of Queensland |
| | | 1 | 2 | Holstein-Frisian Herd Book of Australia |
| E. M. Lumley Hill .. | Bellevue House, Bellevue | 45 | 127 | Australian Hereford Herd Book |
| W. F. Savage .. .. | Ramsay .. .. | 1 | 12 | Illawarra Herd Book of Queensland |
| Tindal and Son .. | Gunyan, Inglewood | 50 | 400 | Australian Hereford Herd Book |
| J. N. Waugh and Son | Prairie Lawn, Nobby | 3 | 28 | Queensland Jersey Herd Book |
| J. H. Fairfax .. .. | Marinya, Cambooya (2) | 9 | 55 | Ayrshire Herd Book of Queensland |
| C. E. McDougall .. | Lyndhurst Stud, Warwick (2) | 25 | 100 | Queensland Shorthorn Herd Book |
| J. Holmes .. .. | "Longlands," Pittsworth | 6 | 20 | Ayrshire Herd Book of Queensland |
| P. Biddles .. .. | Home Park, Netherby | 1 | 20 | Illawarra Dairy Cattle Association |
| A. Rodgers .. .. | Torran's Vale, Lanefield | 1 | 9 | Milking Shorthorn Herd Book |
| R. S. Alexander .. | Glenlomond Farm, Coolumboola | 1 | .. | Holstein-Frisian Herd Book of Queensland |
| State Farm .. .. | Warren .. .. | 3 | 83 | Ayrshire Herd Book of Queensland |
| S. H. Hosking.. .. | Toogooloowah .. | 2 | 15 | Holstein Cattle Club Herd Book |
| W. J. H. Austin .. | Hadleigh Jersey Herd, Boonah | 1 | 2 | Queensland Jersey Herd Book |
| Ditto .. .. | ditto .. .. | .. | 6 | Commonwealth Standard Herd Book |

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH APRIL TO 26TH MAY, 1917.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Lady Margaret | Ayrshire ... ... | 14 Sept., 1916 | 684 | 4·8 | 38·71 | |
| Cocoatina ... | Jersey ... ... | 6 Mar. 1917 | 589 | 4·8 | 33·33 | |
| Lady Melba | Holstein .. ... | 14 Feb., ,, | 801 | 3·4 | 31·82 | |
| Miss Edition | Jersey ... ... | 25 Dec., 1916 | 547 | 4·8 | 30 96 | |
| Violet·e's Peer's Girl | ,, ... ... | 13 Dec. ,, | 433 | 6·0 | 30·77 | |
| Twylish's Maid | ,, ... ... | 2 Nov. ,, | 343 | 7·2 | 29·35 | |
| Comedienne | ,, ... ... | 24 Nov. ,, | 373 | 6·3 | 27·84 | |
| Hedges Madge | Holstein ... ... | 22 Mar., 1917 | 657 | 3·6 | 27·70 | |
| La Hurette Hope | Jersey ... ... | 6 Oct., 1916 | 236 | 6·3 | 27·61 | |
| Miss Betty | ,, ... ... | 27 Mar., 1917 | 613 | 3·8 | 27·31 | |
| Thornton Fairetta | ,, ... ... | 26 May, 1916 | 312 | 7·2 | 26·70 | |
| Glade ... | Shorthorn... ... | 29 Mar., 1917 | 645 | 3·4 | 25·62 | |
| Iron Plate ... | Jersey ... ... | 9 Dec., 1916 | 444 | 5·1 | 25·53 | |
| Lady Spec... | Ayrshire ... ... | 17 Jan., 1917 | 548 | 3·9 | 25·07 | |
| Sylvia II. ... | Shorthorn... ... | 16 Jan. ,, | 570 | 3·6 | 24·05 | |
| Lady Doris | Ayrshire ... ... | 2 April ,, | 521 | 3·8 | 23·22 | |
| Jeannie ... | ,, ... ... | 27 Oct., 1916 | 426 | 4·6 | 23·08 | |
| Lady Annette | ,, ... ... | 11 Nov. ,, | 406 | 4·8 | 22·97 | |
| Glen .. | Shorthorn... ... | 18 Jan., 1917 | 435 | 4·4 | 22·52 | |
| Constancy ... | Ayrshire ... ... | 27 Dec., 1916 | 458 | 4·0 | 21·50 | |
| Miss Security | Jersey ... ... | 27 Mar., 1917 | 573 | 3·2 | 21·39 | |
| Miss Bell ... | ,, .. ... | 1 Aug., 1916 | 272 | 6·6 | 21·29 | |
| Hedges Dutchmaid | Holstein ... ... | 22 Aug. ,, | 406 | 4·4 | 21·03 | |
| Belinda .. | Ayrshire ... ... | 23 Feb., 1917 | 525 | 3·4 | 20·86 | |

A clerical error was made in last month's report; the cow giving the highest yield was Lady Margaret, not Lady Dorset, as stated.

The cows were grazed on natural pastures supplemented by a ration of maize silage mixed with wheaten chaff.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, MAY, 1917.

The total number of eggs laid during the month was 4,193. Twenty pens have two or more birds moulting. The health of the competitors generally has been good. C. Porter had the misfortune to lose one of his pullets with ovary trouble. Westerly winds and cold nights during the early part of the month threw some pens back, but, should the present warm days continue, they should speedily come round again. Mr. E. Chester again wins the monthly prize in the light breeds; while Mr. Claussen scores in the heavies. The following are the individual records:—

| Competitors. | Breed. | May. | Total. |
|---|---|---|---|
| LIGHT BREEDS. | | | |
| E. Chester ... ... ... ... ... | White Leghorns ... | 121 | 239 |
| W. Becker... ... ... ... ... | Do. ... ... | 119 | 210 |
| G. Chester ... ... ... ... ... | Do. ... ... | 91 | 195 |
| W. Crust ... ... ... ... | Do. ... ... | 83 | 187 |
| Oaklands Poultry Farm ... ... ... | Do. ... | 109 | 184 |
| A. H. Padman, S.A. ... ... ... | Do. ... ... | 80 | 177 |
| *G. H Turner ... ... ... | Do. ... ... | 103 | 176 |
| T. R. Hawkins ... ... ... ... | Do. ... ... | 86 | 172 |
| T. A. Pettigrove, Victoria ... .. | Do. ... .. | 106 | 170 |
| *J. R. Wilson ... ... ... ... | Do. ... .. | 60 | 168 |
| T. Taylor ... ... ... ... | Do. ... ... | 83 | 162 |
| *J. Zahl ... ... ... ... .. | Do. ... ... | 90 | 162 |
| *A. W. Bailey ... ... ... ... | Do. ... ... | 82 | 157 |
| R. Holmes ... ... ... ... | Do. ... ... | 74 | 150 |
| F. W. Leney .. ... ... ... | Do. ... ... | 105 | 149 |
| Mars Poultry Farm ... ... ... | Do. ... ... | 78 | 147 |
| C. Porter ... ... ... ... | Do. ... ... | 69 | 141 |
| C. Knoblauch ... ... ... | Do. ... ... | 89 | 133 |
| J. G. Richter ... ... ... .. | Do. ... ... | 63 | 126 |
| *A. T. Coomber ... ... ... .. | Do. ... ... | 76 | 126 |
| E. Cross ... ... . | Do. ... ... | 45 | 121 |
| *Mrs. J. D. Munro ... . .. | Do. ... ... | 87 | 117 |
| Moritz Bros., S.A. ... .. ... | Do. ... ... | 94 | 110 |
| G. Williams ... ... ... ... | Do. ... ... | 51 | 109 |
| Mrs. W. D. Bradburne, N.S.W. ... | Do. ... ... | 40 | 107 |
| D. Fulton ... ... ... .. | Do. ... ... | 39 | 107 |
| *Dixie Egg Plant ... ... ... | Do. ... ... | 88 | 100 |
| C. H. Singer ... ... ... .. | Do. ... ... | 38 | 97 |

## EGG-LAYING COMPETITION—*continued.*

| Competitors. | Breed. | May. | Total. |
|---|---|---|---|
| **LIGHT BREEDS—*continued.*** | | | |
| F. Clayton, N.S.W. | Do. | 58 | 96 |
| A. Shillig | Do. | 35 | 95 |
| Mrs. J. Carrutl ers | Do. | 32 | 91 |
| Mrs. S. J. Sear | Do. | 24 | 89 |
| Quinn's Post Poultry Farm | Do. | 33 | 87 |
| Kelvin Poultry Farm | Do. | 70 | 87 |
| *T. Fanning | Do. | 28 | 85 |
| *J. M. Manson | Do. | 71 | 76 |
| Miss M. Hinze | Do. | 60 | 73 |
| L. G. Innes | Do. | 34 | 71 |
| *G. C. Dennis | Do. | 65 | 66 |
| J. L. Newton | Do. | 35 | 65 |
| C. P. Buchanan | Do. | 28 | 60 |
| E. A. Smith | Do. | 33 | 56 |
| J. Holmes | Do. | 33 | 52 |
| J. Ferguson | Do. | 35 | 44 |
| *Dr. E C. Jennings | Do. | 31 | 43 |
| S. C. Chapman | Black Orpingtons | 22 | 38 |
| G. Howard | White Leghorns | 34 | 34 |
| G. J. White | Do. | 27 | 33 |
| *A. E. Walters | Do. | 30 | 30 |
| **HEAVY BREEDS.** | | | |
| F. A. Claussen | Rhode Island Reds | 101 | 177 |
| *R. Burns | Black Orpingtons | 91 | 167 |
| W. Smith | Do. | 79 | 159 |
| A. E. Walters | Do. | 77 | 158 |
| H. Jobling, N.S.W. | Do. | 68 | 140 |
| *Mars Poultry Farm | Do. | 81 | 135 |
| D. Kenway, N.S.W. | Do. | 57 | 131 |
| W. G. Hanson, N.S.W. | Do. | 77 | 116 |
| Cowan Bros., N.S.W. | Do. | 60 | 100 |
| F. Clayton, N.S.W. | Rhode Island Reds | 80 | 94 |
| P. C. McDonnell, N.S.W. | Black Orpingtons | 58 | 91 |
| Mrs. J. H. Jobling, N.S.W. | Do. | 45 | 71 |
| *Oaklands Poultry Farm | Do. | 39 | 64 |
| *C. F. Dennis | Do. | 56 | 56 |
| *Kelvin Poultry Farm | Plymouth Rocks | 34 | 42 |
| King and Watson, N.S.W. | Black Orpingtons | 32 | 38 |
| *F. W. Leney | Rhode Island Reds | 28 | 38 |
| C. R. Bertelsmeier, S.A. | Black Orpingtons | 21 | 32 |
| C. C. Dennis | White Wyandottes | 24 | 24 |
| E. Morris | Black Orpingtons | 0 | 13 |
| *E. A. Smith | Do. | 10 | 11 |
| J. M. Manson | Do. | 11 | 11 |
| R. Burns | S. L. Wyandottes | 3 | 3 |
| *Miss M. Hinze | Black Orpingtons | 1 | 1 |
| Totals | ... | 4,193 | 7,432 |

* Indicates that the pen is engaged in the single hen test.

RETURNS FROM SINGLE HEN TEST.

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| **LIGHT BREEDS.** | | | | | | | |
| G. H. Turner ... ... ... | 9 | 31 | 37 | 34 | 29 | 36 | 176 |
| J. R. Wilson ... ... ... | 30 | 28 | 22 | 33 | 39 | 16 | 168 |
| J. Zahl ... ... ... ... | 31 | 21 | 40 | 14 | 36 | 20 | 162 |
| A. W. Bailey ... ... ... | 32 | 7 | 31 | 28 | 28 | 31 | 157 |
| A. T. Coomber ... ... ... | 26 | 4 | 29 | 27 | 10 | 30 | 126 |
| Mrs. Munro ... ... ... | 41 | 26 | 18 | 7 | 0 | 25 | 117 |
| Dixie Egg Plant ... ... ... | 18 | 14 | 19 | 31 | 18 | 0 | 100 |
| T. Fanning ... ... ... | 6 | 28 | 13 | 15 | 4 | 19 | 85 |
| J. M. Manson ... ... ... | 15 | 7 | 9 | 5 | 13 | 27 | 76 |
| C. C. Dennis ... ... ... | 12 | 5 | 0 | 14 | 15 | 20 | 66 |
| Dr. Jennings ... ... ... | 0 | 0 | 2 | 7 | 26 | 8 | 43 |
| A. E. Walters ... ... ... | 0 | 1 | 1 | 12 | 16 | 0 | 30 |
| **HEAVY BREEDS.** | | | | | | | |
| R. Burns ... ... ... ... | 20 | 0 | 38 | 8 | 47 | 54 | 167 |
| Mars Poultry Farm ... ... | 27 | 37 | 13 | 37 | 11 | 10 | 135 |
| Oaklands Poultry Farm ... ... | 28 | 0 | 0 | 0 | 36 | 0 | 64 |
| C. F. Dennis ... ... | 1 | 0 | 31 | 18 | 16 | 0 | 56 |
| Kelvin Poultry Farm ... ... | 14 | 0 | 0 | 28 | 0 | 0 | 42 |
| F. W. Leney ... ... ... | 0 | 0 | 0 | 0 | 26 | 12 | 38 |
| E. A. Smith ... ... ... | 1 | 0 | 0 | 10 | 0 | 0 | 11 |
| Miss H. Hinze ... ... ... | 0 | 0 | 0 | 1 | 0 | 0 | 1 |

## POULTRY FLOOR SPACE.

For Leghorns, the allowance for floor space is generally 4 square feet. A house 10 feet square has a superficial floor space of 100 square feet. This will be sufficient for 25 hens. Less space is not allowable, because the active Leghorns require quite as much space as the larger breeds.

# The Orchard.

## SUBSOILING THE ORCHARD BY EXPLOSIVES.

The value of explosives in preparing land for fruit-tree planting as well as for renovating a neglected orchard has frequently been demonstrated in practice in Queensland, and during the past month we have seen the effect of dynamite charges in getting land ready for tree planting within a few miles of Brisbane. With a single plug of dynamite placed at a depth of 15 inches in a hole made by an iron bar, the subsoil was shattered to a depth of nearly 3 feetand laterally to 4 or 5 feet. The following paper, written on the subject by G. N. Hyam for the " New shattered to a depth of nearly 3 feet and laterally to 4 or 5 feet. The Zealand Farmer, Stock, and Station Journal" (May, 1917), deserves to be carefully studied by orchardists in this State:—

" Subsoiling by explosives is," as Mr. Hyam says, " a principle sound in theory and effective in practice."

" The principle of subsoiling, or trenching, is probably the first axiom of farming and horticulture. It was practised by the Romans, and is advocated by all those quaint writers on the ' Arte of Husbandrie' whose books are a source of enjoyment to all modern agriculturists and

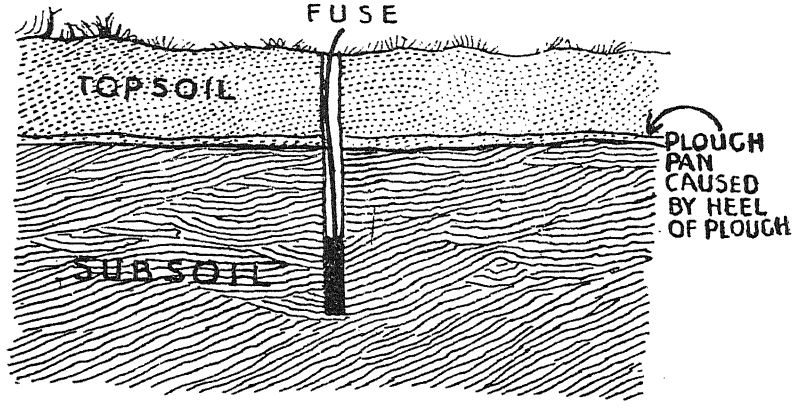



FIG. 1.—METHOD OF INSERTING CHARGE IN NORMAL LAND.

horticulturists who read them. In France the modern vignerons, following the practice of centuries, seldom, if ever, plant their vines without deeply trenching, in spite of the heavy cost of spade cultivation. In the new countries the cost of trenching, or even of subsoiling with the subsoil plough, is almost prohibitive, although the benefits of deep stirring of the soil are generally admitted. The use of explosives for this stirring, although not quite so effective as thorough trenching with

the spade, is a cheap and speedy method which is more efficient than some subsoil ploughs, owing to the fact that the latter only breaks the soil to a depth of about 18 inches, and, furthermore, it leaves a hard layer immediately under the plough sole. The cost of subsoiling with the plough is also almost beyond the average orchardist on account of the

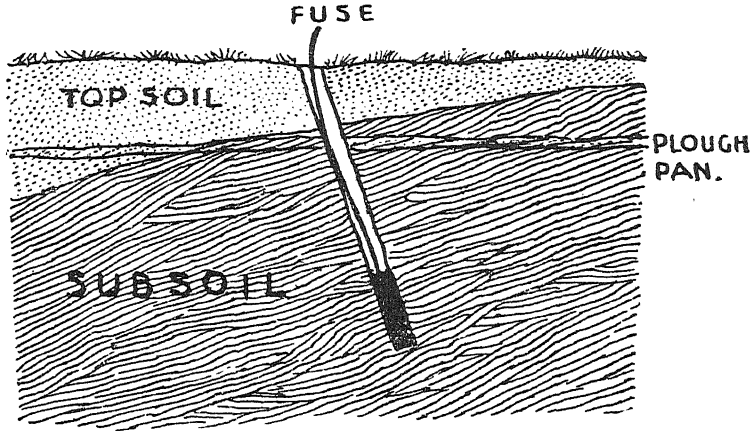



FIG. 2.—METHOD OF INSERTING CHARGE WHERE THE STRATA SHOWS AN INCLINATION, I.E., AT RIGHT ANGLES TO THE DRIFT OF THE SUBSOIL.

heavy draught required, whilst the cost of explosives for the same work is within the reach of everyone. In this article it is only intended to deal with the question from the point of view of the orchardist, but it is equally applicable to agriculture, particularly in the cultivation of root crops, maize, lucerne, and all deep-rooting crops. Too little attention is often given to the preparation of the soil prior to planting an orchard; a

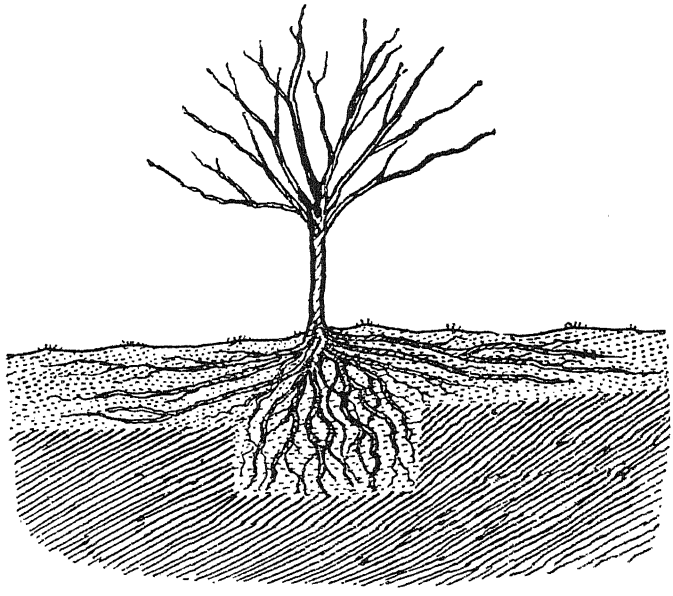


FIG. 3.—ROOT SYSTEM OF YOUNG TREE IN A SPADE-DUG HOLE, SHOWING TENDENCY TO RUN PARALLEL TO SURFACE.

the soil removed should be carefully replaced and stamped down, as otherwise cavities will have been formed which will be a catchment or sump for water.

"In the case of clay soils the clay rarely extends more than 6 feet, and the charge should be inserted at a point three-quarters of its extent; the blast will then render the whole quite porous. In gravelly soils the charge should be fired at about 2 feet from the surface, whilst in sandy or alluvial soils it should be placed just under the "hard-pan" which is nearly always present.

"Subsoiling by explosives may easily be carried out on an established orchard by placing slightly heavier charges in a triangular position, the sides of which should have a length equal to the diameter of the circle covered by its outside limbs. If any of the trees in your orchard are making poor growth, or are not so vigorous as their neighbours, and seem to be particularly susceptible to fungus diseases—such as black spot, ripe rot, &c.—blasting will probably restore them to normal, for in nine cases out of ten 'wet feet' is the cause. It frequently happens that there is a thin strata of clay under such trees that is preventing effective drainage. The effect of subsoiling on the growth of young stock is surprising; and it is an interesting experiment to lift two young trees—one from blasted ground and another one from a spade-dug hole—to compare the root system. In the first case the fibrous roots will have gone down almost perpendicular, whilst in the latter they will be horizontal.

"The best time of the year to do this work is in the early autumn where the trees are to be planted the following winter; and the best results are obtained when carried out after a dry spell, damp soil being rather resistant to the effects of the discharge, with the result that the ground is not broken up into the fine particles that are desirable to allow the nitrogenous bacteria to have the air and moisture they require to carry on their beneficent work.

"Growers of citrus fruits, particularly lemons, will find that they will derive special benefit from subsoiling by this means. The lemon is supposed to be a surface-rooting tree, but some years ago I tried planting them in blasted ground, with the result that their development was very fast. These trees always had a good deep green colour on the leaves, which proved that they had found good stores of nitrogen, and that the nitrogenous bacteria had been active through the thorough aeration of the soil. We also found that the so-called surface roots had taken a downward course, and I now believe that these roots are only compelled to come towards the surface where supplies of nitrogen are lacking."

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## ROOT SYSTEM OF FRUIT TREES.

In reply to a request by a fruit-grower at Proserpine for some information on the above subject, Mr. C. Ross, Instructor in Fruit Culture, says:—"Long experience in Queensland has taught us that a deep-rooted system for citrus and many other fruit trees gives the best

results, and surface roots should be discouraged by continuous cultivation. Surface roots are too susceptible to every climatic change. During light continuous rain, a mass of small surface roots is produced, which die off during drought and are apt to encourage root fungus; they also cause a growth of small twiggy, useless shoots; whereas the roots in the cooler strata, with a more equitable temperature, produce a steady growth of robust, well-ripened wood which soon hardens off into a good bearing habit. The surface soil should be kept in the state of a soil mulch by continual scarifying. Deep tap roots (like those of pear trees) penetrating deep into an uncongenial subsoil should be pruned off."

## REMARKABLE GROWTH OF A BANANA TREE.

A correspondent writes to the "Agricultural News," Barbados, from Antigua to say that he has observed a banana tree exhibiting unusual features of development. The tree to which reference is made, after it had borne a large bunch of bananas, was cut down, as usual, leaving about 12 to 14 inches of stump, around which were several suckers. Instead of the stump withering, as is usual, it commenced a fresh growth from the centre, as occurs in the case of young trees that have not borne. This shoot rapidly developed, sending out leaves, and finally grew to be a second tree, while the suckers all withered and died. The growth of the tree did not end there. After being manured, and the soil having been forked, the plant sent up two new suckers, and a second bunch of fruit has been put out, not coming up as usual out from the side, but it has shot up vigorously, as if from the heart of the tree, almost perpendicularly at first, though later its weight has inclined it so that it rests supported on the apparently abnormal growth of leaves. The editor of the "News" says that a similar case was recently noticed in a garden in Barbados. The growth described is, of course, abnormal; and it is difficult to assign any definite cause to the event.

## RECKONING AMOUNT OF HAY.

A subscriber wants to know how to estimate the amount of hay in a stack. Four hundred cubic feet of hay is roughly estimated as a ton, but there is great variation in the weights of hays compared with volumes. These variations are dependent upon the kind of hay, time of cutting, and treatment in storing.

To estimate the measurement, multiply the length, width, and height of stack together. For example, if the stack is 40 ft. long, 16 ft. wide, and 18 ft. from the bottom to the top, the stack will contain 40 x 16 x 18, or 11,520 cubic feet; 11,520 cubic feet divided by 400 gives 28·8 tons.

# Viticulture.

## THE ALCOHOLISATION OF WINES.

By C. A. GATTINO.

(1.) Is the addition of alcohol necessary?

(2.) If so, is it detrimental to the hygiene?

(3.) In the affirmative case, when and how has it to be done?

(4.) Is the alcoholisation the best and only corrective for rendering conservable weak and defective wines?

These are questions worth while examining as an enlightenment to the wine-grower and the consumer, and as a guide to our competent authorities in the formation of Acts relating to the wine industry.

My replies are the following:—

*In Pro.*

For nearly all wines derived from diseased grapes, an addition of spirit is adapted; but same will have to be made with certain rules, which I will explain later on.

These ill-made wines are of difficult conservation, because they are deficient in alcohol; whilst they contain excessive quantities of azotate matter and very probably special ferments not yet studied. For the said reason these kinds of wines are easy alterable and require more often topping up and sulphurating. But if these precautions are efficient for the conservation of the wines, they are not effective for improving its quality. An adequate addition of good alcohol would certainly assure the conservation of the said badly-made wine, and make it tastier and more hygienic. In saying "more hygienic," I want to make several distinctions. The alcohol we find in the trade is generally detrimental to health; and it is only by the careful choice of the spirit required for fortifying, and by the adequate dosage, that we can prevent laws completely prohibiting the use of the alcohol in the preparation of spirituous beverages. The more ethylic alcohol is contained in the spirit, so much more hygienic is the latter. The spirit extracted from the wine, well rectified and purified, is the only one which contains practically all ethylic alcohol, and is therefore the most hygienic and the most appropriated for fortifying wines.

On the other hand, the spirit of potatoes—which contains amylic alcohol—and the spirit of beetroot or grains (cereals)—which contain propylic, butylic, and amylic alcohol—are more or less hurtful according to their degree of rectification.

The following preferential order has to be given to the well-purified spirits offered by the trade:—(1) Spirit of wine; (2) spirit of grape residues; (3) spirit of beetroot; (4) spirit of grain; and (5) spirit of potatoes.

I will exclude from the choice the spirit of grape residues, which, although well rectified, will always give to the wine a certain taste of "schnapps," and also the alcohol of potatoes, which has injurious effects on the human organism and has never a neutral taste or smell.

We, therefore, have only these three to choose from:—Spirit of wine of at least 48 per cent. o.p.; spirit of grain of at least 66 per cent. o.p.; and spirit of beetroot of at least 66 per cent. o.p.

These spirits, added to the wine in proper and in adequate quantity, can be considered as not hurtful; and the wines so fortified can be considered more hygienic and conservable than the natural wines produced from diseased grapes.

The Academie De Medicine of Paris—in the congress held in 1886—resolved that the alcoholisation of weak natural wines marking not more than 18 degrees Sykes (or 10 parts per centum of alcohol) can be tolerated from the health point of view if the alcoholisation is made of pure spirit and in quantity not above 2 per cent. And the same can be applied to the above-mentioned ill-made wines. Let us see when and how the alcoholisation should be made:—

*When?*—I would do same when the wine has to be racked off. The wine, during the Winter having formed sedimentations, needs to be taken away from the dreggy deposit before the warm temperature of the Spring starts. Make ready first the casks into which the clear wine has to be transferred, and pour into the bottom of the cask the necessary quantity of spirit required for the alcoholisation. Then rack off the wine, slowly pouring the latter above the spirit so as to obtain an intimate mixture.

*How?*—I have already told. By pouring the spirit into the cask before the wine. The dosage depends on the natural alcoholic degree of the wine to fortify; it is, therefore, not possible for me to tell you now the quantity of spirit that should be used. What, however, I will point out is that weak wines do not allow of a too high alcoholisation. The wine would lose all equilibre, acquiring a peculiar burning taste, caused by the disproportion between the wine substances and the spirit.

As I stated, this alcoholisation could be tolerated at the proportion of 2 per cent., and only when the wine resulted unexpectedly weak and ill, independent of the willingness of the wine-maker.

### *In Contra.*

By my article on "The Viticulture and Wine Industry after the War," which appeared in the May issue of the Journal, you could see that I do not like the alcoholisation of wines, and I advised the competent authorities to prevent such alcoholisation as much as possible.

The spirit, not being able to completely incorporate itself into the wine, as soon as it enters into the stomach of the consumer, evaporates, throwing its fumes up to the head, thus producing the sad consequence of drunkenness.

By restrictive legislation in the sale and use of spirits (*i.e.*, State Monopoly), we would attain an increase in wine consumption and a

decrease of the reasons giving existence to the abstinence societies. Legislation should, therefore, facilitate the "sugaring" of the "must" (grape juice) only before or during its fermentation, which practice would attain the same end of the alcoholisation without entailing the same bad consequences. Owing to the special conditions of the sugar industry in the State, this practice would be of great benefit to Queensland, and we would keep the money in our State, instead of buying spirits from other States or abroad, as is actually done. Certainly adequate laws should regulate the use and the permits for sugaring the must for those localities where unfavourable seasons have affected the soundness of the crop.

In any case, the wine-maker has, before all, the very natural way of raising the strength of weak wines, which is:—The blending of the weaker wine with a stronger one.

Especially here in this country, where there is such a great variety of climate, soil, and altitudes able to produce wines with a natural alcoholic title varying from 20 degrees to 30 degrees Sykes, the wine-maker should not need to raise the strength of the wine with the spirit; but in case it should do so, owing to exceptional bad conditions of the season, then the "*sugaring of the must*" is the next best practice.

The addition of sugar to the sour *must*, derived from unripened or ill-grapes, is also a real necessity; and the sugar to be preferred for this addition is just the sugar of cane.

My conclusive opinion about the alcoholisation of wines is that all wines which were fortified with spirit should be sold as such, whether as draught or in bottles. I consider that the public consumer has the right to know what sort of wine he is getting—either the natural wine or the one fortified with spirit.

And, again, the sale of wines fortified with spirit, offered to the consumer under the same classification of the natural wines, is an injustice to the public consumer, to the small wine-grower, and is detrimental to the progress of the wine industry.

## AN AUTOMATIC FROST KILLER.

"Popular Mechanics" describes the invention of a simple thermostatic controlling device. A Los Angeles man has developed an ingenious apparatus for rendering the smudge pots used by orchardists self-operating. The appliance, which may be fitted to any standard type of pot, is regulated by a small copper rod. When the atmospheric temperature drops to a predetermined point, the contraction of the rod is sufficiently great to release a cup containing an acid. The liquid is poured into a small chamber provided in the smudge pot. This holds a chemical substance which burns upon the addition of the acid, producing a flame that ignites the crude oil used in the pot. The thermostat may be adjusted so as to release the acid when the temperature falls to any specific degree. With this apparatus in use, an orchard may be protected from frost without personal attention being given it. The pots are placed beneath the trees and brought into use automatically when they are needed instead of having to be lighted by hand.

# Botany.

## ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND

By C. T. WHITE, Acting Government Botanist.

No. 9.

### On the Species of Datura (Thorn Apple) Naturalised in Queensland.

"STRAMONIUM" OR "COMMON THORN APPLE" (*Datura Stramonium, Linn.*).

*Description.*—A coarse, ill-scented weed of annual duration. Stems pale green. Leaves irregularly cut and toothed, dark green above, paler beneath, on short leaf-stalks. Flowers white, trumpet-shaped, solitary in the forks of the branches. Capsule ovoid, prickly, opening at the top when mature into several valves (usually four). Seeds numerous, dark brown or blackish, flat and wrinkled.

A very common weed of waste places and of cultivation almost throughout the State. It is more commonly known in Queensland as "Stramonium."

It is widely spread over the whole world, with the exception of the colder, temperate regions. Like many other widely-distributed plants, its country of origin is doubtful. In America it goes under the name of "Jimson Weed."

*Properties, Uses, &c.*—The whole plant is poisonous. It is, however, usually left untouched by all classes of stock. Drying does not destroy the toxicity, and in the United States it is recorded that cattle have been poisoned by eating the young leaves dried in hay. There are cases on record of children having been poisoned through eating the seeds and putting the flowers in their mouths. In South Africa the seeds are said to be fatal to young ostriches. Both seeds and leaves are used medicinally. In a long account of the medicinal properties of *Datura,* Bentley and Trimen state—"In asthma, catarrhs, and other cases the dried leaves are smoked like tobacco, or inhalation from their infusion in hot water is resorted to. But its use in these directions requires caution, as it has proved highly injurious and in some instances fatal. In the form of ointment, fomentations, &c., the leaves and seeds of different species of *Datura* have been found useful in allaying pain, &c. Locally applied to the eye, *Stramonium* produces dilatation of the pupil."

PURPLE THORN APPLE (*Datura Tatula,* Linn.).

This principally differs from *Datura Stramonium* in its flowers being of a purple or lavender colour paling to white in the throat. The stems, leaf-stalks, principal veins of the leaves, and capsules are all of a deep purple, not pale green as in *D. Stramonium,* of which by many it is regarded—perhaps correctly so—as a variety. For the sake of

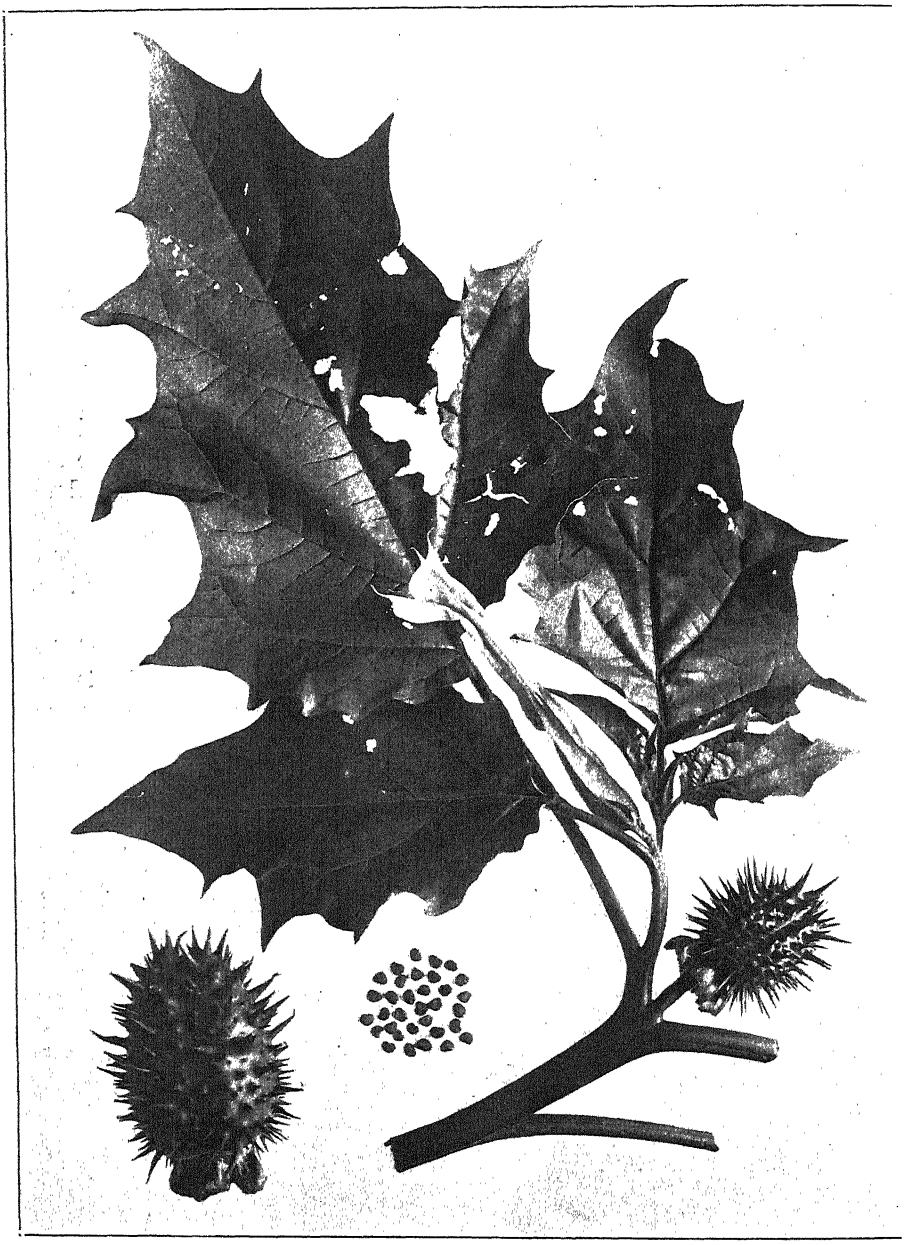


PLATE 1.—DATURA TATULA (PURPLE THORN APPLE).
The common form (D. Stramonium) mainly differs from this in having pale green stems and white flowers.

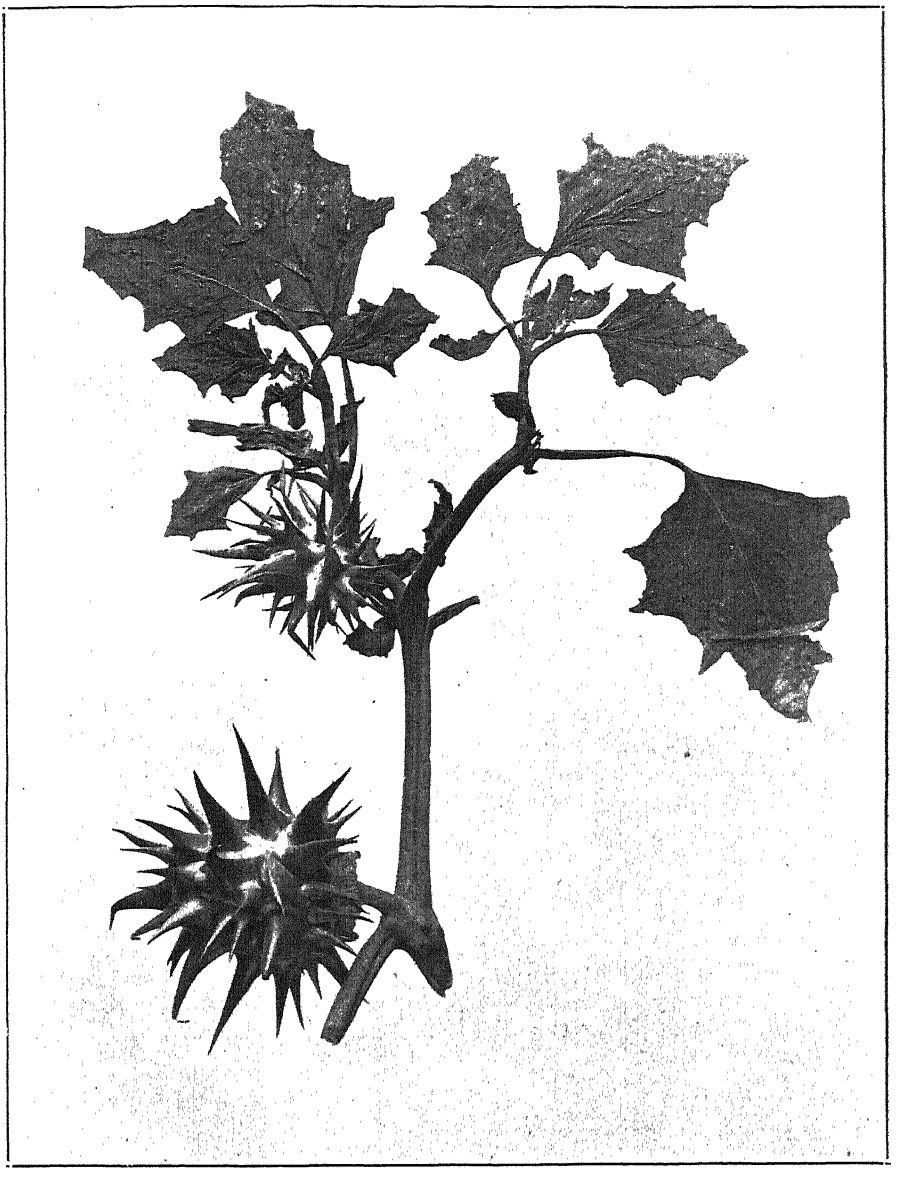


PLATE 2.—DATURA FEROX.
A "Thorn Apple" new to Queensland.

convenience it is here recorded as a separate species. It is not quite so common in Queensland as *D. Stramonium*. Its range, properties, uses, &c., are the same.

## A "THORN APPLE" NEW TO QUEENSLAND (*Datura ferox*, Linn.)

*Description.*—An ill-smelling, coarse, annual weed. The young shoots pubescent. Stems pale-green, puberulous. Leaves coarsely toothed, beset with a few scattered hairs. Flowers white, solitary in the forks of the branches. Capsule puberulous, covered with long, large spines.

Specimens of this week were collected at Macalister, Western Darling Downs, by Mr. E. W. Bick a little over a year ago, who stated that it was the common species in that district; it was then determined as *D. ferox*, but, having little information about the plant in the literature available here, specimens were sent to the Royal Botanic Gardens, Kew, England, and the identification confirmed. Mr. E. Kenny, Macalister, to whom we are indebted for the specimen here figured, states (May, 1917):—"The council men call it 'Stramonium,' and have pulled and cut it nearly all out, and the cold weather has settled the rest for this season." The local name is apt to cause confusion with the commoner species.

*Properties, Uses, &c.*—The whole plant, like others of the genus, is poisonous. It no doubt possesses properties similar to if not identical with *D. Stramonium*.

*Country of Origin.*—I cannot at all say how the plant came here. According to Engler and Prantl ("Die Naturlichen Pflanzenfamilien") and to Koorders ("Excursionsflora von Java"), the species is native to Spain and Sicily. The "Index Kewensis" and other works give it as a native of China. Forbes and Hemsley ("Index Florae Sinensis") state:—"*Datura Metel* and *D. ferox*, both widely spread plants, are recorded as occurring in China." We must leave it at that for the present.

## HAIRY THORN APPLE (*Datura Metel*, Linn.).

A tall undershrub. Stems stout, much-branched, finely glandular-hairy. Leaves softly hairy, entire or toothed, often wavy edged. Flowers white, large, trumpet-shaped. Calyx tubular, glandular-hairy. Capsule, pubescent, globular, large (about 2 inches diameter), reflexed (nodding), prickly.

A native of Tropical America; a common weed of roadsides and waste-places about towns in Queensland.

A poisonous plant, like the preceding species.

*Datura fastuosa* is recorded as naturalised in Queensland; all the specimens I have seen so labelled, however, belong to *D. Metel*.

A native species (*Datura Leichhardtii*) is common in some Western and Northern localities.

*Eradication.*—Hand-pulling or hoeing up before the plants bear ripe fruit is about the only certain method of dealing with these weeds.



PLATE 3.—DATURA METEL.
"Hairy Thorn Apple."

## A PLANT POISONOUS TO STOCK.

Dr. J. Shirley, Principal of the Teachers' Training College, Brisbane, in a letter to the Editor of the "Queensland Agricultural Journal," draws attention to a yellow-flowering climbing plant known locally as the Cape Ivy. It has no connection with the Ivy family, but is a climbing relation to the well-known English groundsel. Its true name is *Senecio latifolius*. At the present moment the Brisbane suburbs have their gardens gay with its coloured flowers. From the Presidential Address by Dr. R. Marloth, delivered at Cape Town on 30th May, 1914, and published at Cape Town by the Cape Chemical Society, Dr. Shirley quotes the following extract:—"*Senecio latifolius* (Molteno disease plant) contains two alkaloids—viz., senecifoline and senecifolidine. The alkaloids produce hepatic cirrhosis, and must be considered to be the cause of the deleterious action of the herb."

From the above it is seen that the plant is the cause of a stock disease, producing a fibrous condition of the liver, and a change to a yellowish colour, followed by atrophy and death.

The plant was brought from the Cape by members of contingents returning from the Boer War. "It is being planted widely all over Queensland," says Dr. Shirley, "and as its tiny fruits, usually regarded as seeds, are scattered like thistledown by the winds, we shall have it widely and firmly established."

It is to be hoped that those who have planted this pernicious weed will give heed to Dr. Shirley's timely warning, and promptly eradicate it.

[Mr. C. T. White, Acting Government Botanist, referring to this plant, says that "the Cape Ivy is not *Senecio latifolius*. The poison herb *S. latifolius* of South Africa is quite a distinct plant. I look upon the Cape Ivy as *S. tamoides*."—Ed. "Q.A.J."]

## CROP ROTATION: EFFECT ON FERTILITY.

Some remarkable figures showing the importance of rotation (says the "Producers' Review") are given by Professor C. A. Gearhart, of the Ohio Experiment Station. In a twenty-year test with corn the following results were obtained, average yields per acre during the first years being compared with average yields during the fourth five-year period, and then the average for twenty years being given.

Average corn yield per acre in bushels:—

| | First Five Years. | Fourth Five Years. | Average for Twenty Years. |
|---|---|---|---|
| Continuous—no manure .. | 26·26 .. | 8·44 .. | 15·47 |
| Rotation—no manure .. | 31·89 .. | 20·31 .. | 28·95 |
| Continuous—with manure .. | 43·13 .. | 30·22 .. | 37·02 |
| Rotation—with manure .. | 40·73 .. | 55·83 .. | 51·81 |

Even with manure it will be seen the yields in fields continuously cultivated in corn decreased 13 bushels per acre (comparing the fourth five-year period with the first five-year period), while rotation with the manured fields increased the yields more than 15 bushels per acre.

# Entomology.

## THE CANE BEETLE.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. Jarvis, the Entomologist:—

Grubs of the greyback cane beetle are now in the third stage, fully grown, and about to pupate.

Greenhills Plantation, near Gordonvale, is reported to be suffering severely this season, 300 acres or more being badly affected; and the pest is also doing great damage in the Highleigh and Aloomba districts.

Whilst ploughing cane land during April and May one frequently turns up numbers of small grubs about three-quarters of an inch long, which, occurring in association with third-stage *albohirta* 1¾ inches in length, are erroneously believed by most cane-farmers to be young larvæ of this species that have emerged from eggs laid during the present season, while they suppose the others to be full-sized grubs of our greyback cockchafer, but hatched the previous year. It may interest growers to learn that these small larvæ, in evidence just now, represent the second stage of *Lepidiota frenchi*, a destructive scarabæid beetle of a dark reddish-brown colour, and figured in Bulletin No. 3 of this Office ("Notes on Insects Damaging Sugar Cane in Queensland," p. 37, fig. 41). Its metamorphosis apparently occupies a period of two years, while the complete life-cycle of *albohirta* (from egg to perfect insect) takes only twelve months.

Although both beetles oviposit during December and January, the grubs of the latter species attain full growth in a space of about six months (January to June), pupating, as a rule, from July to September: whereas those of *frenchi*, which mature very slowly, remain in the larval stage for fully a year longer; thus accounting for the present occurrence in the same furrow or large and comparatively small grubs.

Owing to its two years' life-cycle, the second and third larval stages of *frenchi* are both procurable during winter months.

Fully-grown grubs of this insect are usually mistaken for those of *albohirta*, which they closely resemble in size and general appearance. As mentioned in a previous report, *Lepidiota frenchi*, although feeding habitually on roots of cereals and other herbaceous plants, has already acquired a liking for cane ("Australian Sugar Journal," Vol. VIII., p. 917).

A decided outbreak of this pest, which occurred recently at Meringa on red volcanic soil, was investigated on the 30th May, when 186 second-stage grubs were collected in a few hours from 50 chains of furrow, representing about 2,418 grubs per acre, or 0·85 to each stool of cane. Although one of our serious cane beetles, second perhaps to *albohirta* in economic importance, this insect fortunately oviposits, as a rule, in uncultivated soil that is densely covered by grass or weeds, &c. This being the case, it behoves growers to maintain, during December and January, a system of clean culture on areas devoted to cane, and more particularly on fallow land that may be reserved for the planting of an early crop. Both *Lepidiota frenchi* and *albohirta* lay their eggs during these months, and are strongly attracted by a luxuriant growth of vegetation between the rows, so that land in this condition is almost sure to become badly infested. The former insect (*frenchi*) usually oviposits freely in such fallow land, with the result that, when it is ploughed for the early crop in May or April, the grubs from these eggs, being about five months old and still small, are often overlooked or allowed to remain in the soil. As a matter of fact, however, these young larvæ have still about a year to pass before pupating, during which time they are capable of causing considerable injury; moreover, after such infested land has been planted and the weeds destroyed, they are necessarily obliged to subsist almost entirely on the roots of the cane.

## QUEENSLAND SUGAR MILLS.

### CRUSHING DATES.

The following crushing dates of Queensland Sugar Mills are in addition to those published in the June issue of the "Queensland Agricultural Journal":—

| | |
|---|---|
| Moreton | 10th July |
| Bingera | 19th June |
| Fairymead | 11th June |
| Goodwood | 13th June |
| Palms | Middle of June |
| South Johnstone | Middle of June |
| Proserpine | Middle of June |
| Mount Bauple | 20th June |
| Babinda | Started 26th May |
| Hambledon | 17th June |

# General Notes.

## COCOANUT BUTTER.

Owing to the high price of butter, we have had more than the usual inquiries as to how to make cocoanut butter. Everyone knows how to make cocoanut oil, but the making of cocoanut butter is quite a different process, and requires some skill. Cocoanut butter is being very largely used in the place of dairy butter in the United Kingdom and France, and before the war it was largely used in Germany. It can be used wherever dairy butter is used. Here is the process:—Grate or grind in a mill the meat of the nut as fine as it can be ground, and for the meat of each average nut add a pint of boiling water. Put this in a press, so that the milk can be squeezed out separate from the pulp. This milk can be used in place of cow's milk for any purpose, and is specially good with stewed fruit. To make butter, this milk can be separated in a separator or let stand in a pan to let the cream rise, which it should do in about the same time as the cream in cow's milk. This can be set to ripen, and be churned in the usual way. The whole process is in every respect the same as in making dairy butter. Wash out the butter-milk; add salt to taste. As a rule, this butter is white, and annatto colouring can be added. According to the size of the nuts, it should take from 6 to 10 nuts to make 1 lb. of butter. The churning should be done in a cool temperature, say between 60 to 70 degrees.—"Journal of the Jamaica Agricultural Society."

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## AN IMPORTANT CANADIAN INVENTION.

A correspondent of "The Watch Tower" (a Brooklyn, U.S.A., publication) gives the following account of a Canadian invention which he says bids fair to become of vast importance, especially to the farmer. Throughout Canada, the States, and all over the world are immense stacks of straw (many millions of them) which hitherto have been useless, and were burnt to get them out of the way. These are now to be very profitably utilised. A company has been organised in Moose Jaw, Canada, capitalised for the purpose of manufacturing this invention and selling it to the farmers. Briefly, the invention is this:—

The farmer can build a plant at a nominal cost, which will generate gas from the straw. This gas will light and heat the home, furnish power for the threshing machine, or any other machine needing power, or.

compressed in a tank similar to a Prestolite tank, will run the automobile at less expense by far than by present methods. Thirty minutes' work by a man, woman, or child will generate 1,000 feet of gas, which is stored in a tank for future use, and the most delicate instrument necessary is a pitchfork. This is not all. After the gas is driven off (by fire), the coke-like refuse is utilised, and the products made from a ton of straw, aside from the gas, are worth 15 dollars. These consist of tar, oils, and pitch; and, lastly, that which remains is pressed into briquettes of coal, either hard or soft, which make the very best of fuel. It costs about 1½ dollars a ton to make this coal. The installation expense is not high—a couple of ovens, a gas tank, a compressor for gas, one to compress the refuse into coal, and receptacles for the tar and coal.

The writer says he visited the demonstration room and saw all the processes.

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## RESISTANCE OF BUDDED COTTONS TO DISEASE.

Mr. Harland states in the Report of the Agricultural Department for St. Vincent, 1915-1916, that during the year a study was made of the resistance of budded cottons. The budding of cottons is a simple operation. A young plant about 2 feet high can be used as stock, the bud being inserted about 1 foot from the ground. Provided that the sap is flowing freely in both stock and scion, it is immaterial whether petioled or non-petioled budwood is used, or whether the stock and the branch from which the bud is taken are approximately of the same diameter or not.

The following conclusions are arrived at from a study of the behaviour of budded cottons:—

(1.) If the stock is susceptible and the scion immune, the scion retains its immunity completely.

(2.) If the stock is immune and the scion susceptible, budding apparently confers on the scion a certain degree of resistance.

(3.) If the stock is fairly resistant and the scion susceptible, the scion remains susceptible, though perhaps not so susceptible as when on its own roots.

(4.) If the stock is susceptible and the scion fairly resistant, the same degree of resistance is retained by the latter.—"Agricultural News," Barbados.

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## CO-OPERATIVE PLOUGHING.

Last year a co-operative society was formed in France for machine ploughing. The society is composed of eight members, who farm between them about 578 acres. The fields are situated close to each other, and are from 25 to 62 acres each, and on flat or slightly undulating ground, thus being in all respects favourably situated for ploughing machines. About one-third of the acreage is heavy clay, the rest is loam. The

co-operative society uses a 25-horse power tractor and a three-furrow plough. The tractor cost about £525, and the plough £56; the expense is borne by eight members in proportion to the areas to be ploughed. The statutes of the society are copied from the model drawn up by the Ministry of Agriculture. The yearly subscription of each member is 16s., and the supplementary contributions may not exceed £4. The expenses of all kinds will be divided every month *pro rata* of the acreage ploughed during the time. The order of succession in which the members are to use the outfit is settled by drawing lots, and when the machine has been round once the order will be reversed. A preference, however, is given to the heavier land, which is to be ploughed during fine weather. The society has been granted a subvention of about £160 by the Ministry of Agriculture.—"Producers' Review."

## A PROFITABLE RHODES GRASS CROP.

Rhodes Grass as a forage crop appears to be driving Paspalum into the background. Since it was first introduced it has made rapid progress in the estimation of dairy farmers and agriculturists generally as a splendid fodder for stock. The accompanying illustration shows portion of a fine field of 30 acres growing on Mr. H. A. Flynn's farm at Narko,

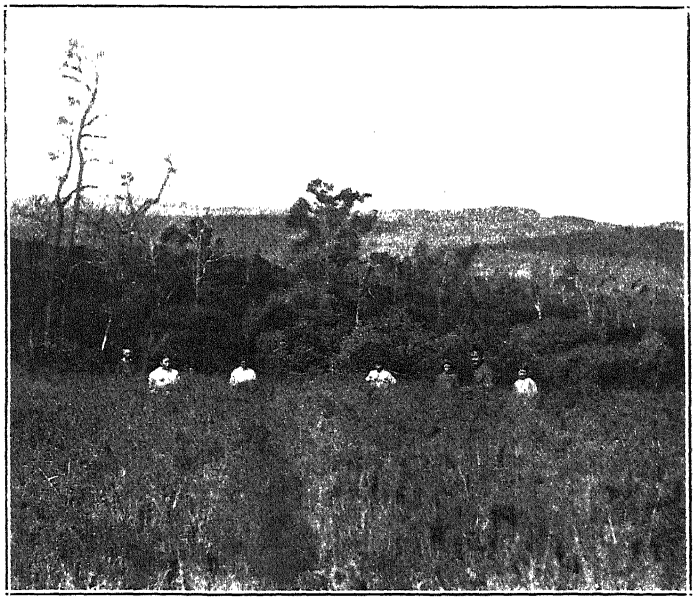


PLATE 4.—A PROFITABLE RHODES GRASS CROP.

on the Cooyar railway line, about 40 miles from Toowoomba, which has been cut twice during the season. The grass averages 5 feet 6 inches in height, and the whole of the seed has been sold to a firm of seedsmen in Brisbane. For the past six years Mr. Flynn has regularly harvested the seed.

## SOCIETIES, SHOW DATES, ETC.

Dalby.—Dalby Pastoral and Agricultural Society.—The show dates have been changed from 1st and 2nd August to 3rd and 4th October.

Deeford.—Alma Creek Branch of the Queensland Farmers' Union. J. Erickson, hon. secretary.

Kilcoy.—Kilcoy Pastoral, Agricultural, and Industrial Society. Show dates, 12th and 13th July.

Palmwoods.—Palmwoods Progress and Fruit Growers' Association. Norman Cope, secretary.

Tara.—Gums and South Glen Branch of the Queensland Farmers' Union. R. F. Morkham, secretary.

Waverley.—Wondalli Branch of the Queensland Farmers' Union, *viâ* Yelarbon. C. H. Cameron, secretary.

# Answers to Correspondents.

## TO ASCERTAIN THE AREA OF A FIGURE WITH FOUR SIDES OF UNEQUAL LENGTH WITHOUT OBTAINING A DIAGONAL.

"ENGINEER"—

This can only be ascertained by a trigonometrical formula which is somewhat difficult to understand without mathematical knowledge. If one angle of the figure is a right angle, then the solution is easy, because the hypothenuse can be found by adding together the squares of the base and perpendicular, and finding the square root of sum. This will then divide the figure (which may be a trapezium or a trapezoid) into two triangles, the area of each of which can be found by the rule given in this Journal for January, 1915,* inasmuch as the hypothenuse will be the third side of each triangle. If all angles are obtuse or acute, the only way is to find the sine by the use of instruments, and from that calculate the length of a diagonal, when the calculation is easy by dividing into triangles.

*Example.*—$19 + 15 + 14 = \frac{48}{2} = 24 - 19 = 5$

$24 - 15 = 9$

$24 - 14 = 10$

$24 \times 5 = 120 \times 9 = 1080 \times 10 = 10800$, the square root of which is 10·40 acres.

* To obtain the area of a block in triangular form with sides, say, 14, 15, and 19 chains respectively, add the three sides together, and take half the sum. Then multiply the half sum and the three remainders together. The square root of the last product will give the area.

## TREATMENT FOR WORMS IN A FOAL.

F. E. DEDUHN, Hillside, Rosewood—

Your letter relative to an affection from which a foal is suffering was referred to the Veterinary Department, and Veterinary Surgeon Speer reports as follows:—

"As the foal is only six months old, I am strongly against drenching, as it is somewhat risky. The worm is probably *Ascaris megalocephalus*, and, except for sometimes causing attacks of colic, I do not think is very harmful. I should advise the following:—

Saccharated carbonate of iron, 15 grains; sulphate of iron, 15 grains. Make one powder.

Give one powder night and morning in damp food for 14 days: also, add a ration of coarse salt to the feed. These powders are practically tasteless, and there should be no difficulty in getting the foal to eat them. A dose of castor oil before starting the powders and a dose to clear the foal out when they are finished are advisable."

## THE McMASTER PATENT MOTOR GATE.

INTERESTED, Dalby—

This gate is made in two sections each 12 feet long by 8 feet wide. The sides are of angle steel hinged to the entrance posts. The battens, as shown in photo. are 6 inches by 1½ inches hardwood bolted to the angle steel sides with an extra support of a 4-inch by 1½-inch batten in centre, bolted to battens on the rising and falling end of the gate. A

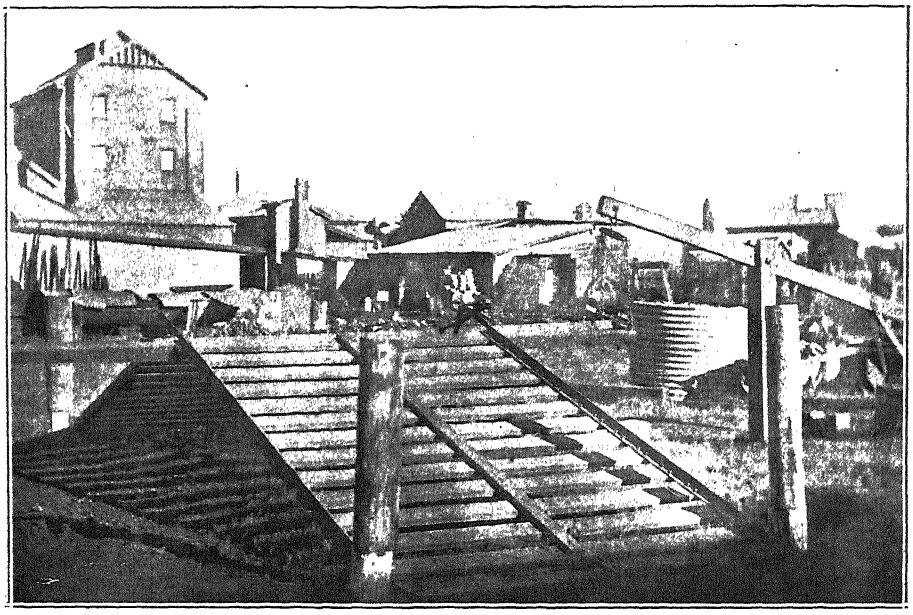


PLATE 5.—THE McMASTER PATENT MOTOR GATE.

5-inch by 3-inch hardwood stringer is bolted to the angle frame. These stringers are attached to a rocking beam with eye-bolts and chains. There are two beams, 6 inches by 3 inches hardwood, 12 feet long, hinged in centre through a hardwood post, 7 inches by 7 inches. On the opposite end of each beam is a balance box of 1½ inches hardwood strongly made and secured to beam by wrought-steel plates. These boxes are of sufficient capacity to hold soil or gravel to balance the gate. The agents consider this an improvement to the gate erected on the Winton road. There is less friction with the beam than with a rope running over pulleys, and you can also balance the gate better than with cast-iron weights, and at less cost.

The agents for the gate are Messrs. Burns and Twigg, engineers, Rockhampton, who supply gate complete, also plan for erection of same, for £20 f.o. truck or steamer, Rockhampton. Shipping weight, 28 cwt.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JUNE, 1917.

| Article. | | JUNE. Prices. |
|---|---|---|
| Bacon | lb. | 9d. to 1s. |
| Barley (Cape) | bush. | 2s. to 2s. 6d. |
| Barley (Spineless) | „ | 3s. 9d. to 5s. 6d. |
| Bran | ton | £5 15s. |
| Broom Millet | „ | £19 to £24 |
| Butter (1st grade) | cwt. | 158s. 8d. |
| Chaff, Mixed | ton | £3 10s. to £6 |
| Chaff, Oaten | „ | £5 to £5 10s. |
| Chaff, Lucerne | „ | £4 to £5 10s. |
| Chaff, Wheaten | „ | £2 10s. |
| Cheese | lb. | 9d. to 9½d. |
| Flour | ton | £12 |
| Hams | lb. | 1s. 3d. to 1s. 4d. |
| Hay, Oaten | ton | ... |
| Hay, Lucerne | „ | £2 10s. to £3 10s. |
| Honey | lb. | 5d. to 5½d. |
| Maize | bush. | 2s. 7½d. to 2s. 8½d. |
| Oats | „ | 1s. 6d. to 2s. 6d. |
| Onions | ton | £7 to £8 |
| Peanuts | lb. | 3d. to 4½d. |
| Pollard | ton | £7 2s. 6d. |
| Potatoes | „ | £5 15s. to £6 10s. |
| Potatoes (Sweet) | sug. bag | 1s. to 1s. 6d. |
| Pumpkins (Cattle) | ton | £2 to £2 5s. |
| Eggs | doz. | 1s. 7d. to 2s. |
| Fowls | per pair | 3s. to 4s. 6d. |
| Ducks, English | „ | 3s. 6d. to 3s. 9d. |
| Ducks, Muscovy | „ | 4s. to 5s. |
| Ducks (Wild) | „ | 3s. 6d. |
| Geese | „ | 6s. to 7s. |
| Turkeys (Hens) | „ | 7s. to 8s. |
| Turkeys (Gobblers) | „ | 13s. to 15s. |
| Wheat (Milling) | bush. | 4s. |
| Hares (alive) | per pair | 15s. |

## VEGETABLES—TURBOT STREET MARKETS.

| | |
|---|---|
| Asparagus, per bundle | ... |
| Cabbages, per dozen | 2s. 6d. to 7s. |
| Cauliflowers, per dozen | 3s. to 10s. |
| Celery, per bundle | ... |
| Cucumbers, per dozen | 2s. to 3s. 6d. |
| Beans, per sugar bag | 5s. to 7s. |
| Peas, per sugar bag | 6s. to 10s. 6d. |
| Carrots, per dozen bunches | 10d. to 1s. |
| Chocos, per quarter-case | 2s. to 2s. 2d. |
| Beetroot, per dozen bunches | 8d. to 9d. |
| Marrows, per dozen | 1s. 6d. to 4s. |
| Lettuce, per dozen | 1s. to 2s. |
| Parsnips, per bundle | 7d. to 10d. |
| Sweet Potatoes, per sugar bag | 1s. to 1s. 6d. |
| Table Pumpkins, per dozen | 1s. 9d. to 3s. |
| Tomatoes, per quarter-case | 1s. to 4s. |
| Turnips, per dozen bunches | 10d. to 1s. |
| Rhubarb, per dozen bundles | .. |

## SOUTHERN FRUIT MARKETS.

| Article. | JUNE. Prices. |
|---|---|
| Bananas (Queensland), per case | 6s. to 12s. |
| Bananas (Fiji), per case | 14s. 6d. to 16s. 6d. |
| Bananas (G.M.), per case | 16s. 6d. to 18s. |
| Custard Apples, per tray | 5s. to 7s. |
| Lemons (Local), per bushel-case | ... |
| Mandarins, per bushel-case | 6s. to 7s. |
| Oranges (Navel), per case | 6s. to 10s. |
| Oranges (other), per case | 6s. 6d. to 7s. 6d. |
| Papaw Apples, per half-bushel-case | 8s. to 9s. |
| Passion Fruit, per half-case | 1s. 6d. to 6s. 6d. |
| Persimmons, per half-case | 1s. 6d. to 3s. 6d. |
| Pineapples (Queens), per double-case | 10s. to 12s. |
| Pineapples (Ripleys), per double-case | 8s. to 10s. |
| Pineapples (Common) per double-case | 7s. 1d. to 9s. 1d. |
| Tomatoes, per half-bushel-case | 6s. to 8s. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | JUNE. Prices. |
|---|---|
| Apples, Eating, per case | 9s. 6d. to 11s. |
| Apples, Cooking, per case | 9s. to 10s. |
| Bananas (Cavendish), per dozen | 1d. to 3½d. |
| Bananas (Sugar), per dozen | 2d. to 3d. |
| Citrons, per hundredweight | 10s. |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per quarter-case | 3s. to 3s. 6d. |
| Custard Apples, per tray | 3s. to 3s. 6d. |
| Granadillas, per quarter-case | ... |
| Grapes, per lb. | ... |
| Lemons (Lisbon), per quarter-case | 3s. 6d. to 4s. 6d. |
| Limes, per quarter-case | 3s. to 4s. 6d. |
| Mandarins, per quarter-case | 3s. to 5s. 6d. |
| Oranges (Navel), per case | 9s. to 10s. |
| Oranges (other), per case | 2s. 6d. to 3s. |
| Oranges (Seville), per hundredweight | 11s. |
| Papaw Apples, per case | 1s. 6d. to 3s. |
| Passion Fruit, per quarter-case | 3s. 6d. to 4s. 6d. |
| Pears, per quarter-case | 8s. to 10s. |
| Peanuts, per lb. | 3d. to 4½d. |
| Persimmons, per quarter-case | 4s. to 5s. |
| Pineapples (Ripleys), per dozen | 5s. to 8s. |
| Pineapples (Rough), per dozen | 9d. to 2s. |
| Pineapples (Smooth), per dozen | 1s. 6d. to 3s. |
| Pomeloes, per hundredweight | 9s. to 10s. |
| Quinces, per quarter-case | 3s. |
| Rosellas, per sugar bag | 3s. 6d. to 4s. |
| Strawberries, per dozen boxes | 6s. to 12s. 3d. |
| Tomatoes, per quarter-case | 1s. 6d. to 3s. 9d. |

## TOP PRICES, ENOGGERA YARDS, MAY, 1917.

| Animal. | MAY. Prices. |
|---|---|
| Bullocks ... ... ... ... ... ... ... ... | £18 5s. to £22 12s. 6d. |
| Cows ... ... ... ... ... ... ... ... | £12 15s. to £13 15s. |
| Merino Wethers ... ... ... ... ... ... ... | 39s. 6d. |
| Crossbred Wethers ... ... ... ... ... ... | 45s. 3d. |
| Merino Ewes ... ... ... ... ... . ... | 33s. |
| Crossbred Ewes ... ... ... ... ... ... ... | 44s. |
| Lambs ... ... ... ... ... ... ... ... | 33s. |
| Pigs (Porkers) ... ... ... ... ... ... ... | 50s. |

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MAY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MAY, 1917 AND 1916, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. May. | Average Rainfall. No. of Years' Records. | Total Rainfall. May, 1917. | Total Rainfall. May, 1916. |
|---|---|---|---|---|
| *North Coast.* | In. | | In. | In. |
| Atherton ... ... | 2·05 | 15 | 3·26 | 2·08 |
| Cairns ... ... | 4·58 | 34 | 2·39 | 3·60 |
| Cardwell ... ... | 3·65 | 44 | 3·56 | 1·72 |
| Cooktown ... ... | 2·95 | 40 | 1·47 | 4·67 |
| Herberton ... ... | 1·57 | 29 | 3·83 | 1·69 |
| Ingham ... ... | 3·53 | 24 | 3·75 | 1·97 |
| Innisfail ... ... | 12·46 | 35 | 17·49 | 7 01 |
| Mossman ... ... | 3·52 | 4 | 4·70 | 3·39 |
| Townsville ... ... | 1·39 | 45 | 2·40 | 0·60 |
| *Central Coast.* | | | | |
| Ayr ... ... ... | 1·16 | 29 | 2·66 | 0·89 |
| Bowen ... ... | 1·39 | 45 | 1·51 | 1·31 |
| Charters Towers ... | 0·80 | 34 | 1·35 | 0·73 |
| Mackay ... ... | 3·96 | 45 | 1·65 | 3·19 |
| Proserpine ... ... | 5·58 | 13 | 2·39 | 5·28 |
| St. Lawrence ... | 1·92 | 45 | 1·01 | 0·62 |
| *South Coast.* | | | | |
| Biggenden ... ... | 2·06 | 17 | 0·92 | 2·42 |
| Bundaberg ... ... | 2·85 | 33 | 1·84 | 1·45 |
| Brisbane ... ... | 2·91 | 66 | 0·48 | 1·00 |
| Childers ... ... | 2·42 | 21 | 1·69 | 3·64 |
| Crohamhurst ... | 5·00 | 25 | 2·47 | 2·20 |
| Esk ... ... ... | 2·25 | 29 | 0·25 | 0 91 |
| Gayndah ... ... | 1·67 | 45 | 1·09 | 0·54 |
| Gympie ... ... | 3·16 | 46 | 1·61 | 1·75 |
| Glasshouse M'tains | 3·68 | 8 | 2·18 | 1·60 |
| Kilkivan ... ... | 2·09 | 37 | 0·77 | 0·91 |
| Maryborough ... | 3·07 | 45 | 2·54 | 5·76 |

| Divisions and Stations. | Average Rainfall. May. | Average Rainfall. No. of Years' Records. | Total Rainfall. May, 1917. | Total Rainfall. May, 1916. |
|---|---|---|---|---|
| *South Coast*—continued: | In. | | In. | In. |
| Nambour ... ... | 5·03 | 20 | 3·60 | 3·84 |
| Nanango ... ... | 1·72 | 34 | 0·46 | 0·96 |
| Rockhampton ... | 1·61 | 29 | 1·09 | 0·14 |
| Woodford ... ... | 3·03 | 29 | 0·66 | 1·52 |
| *Darling Downs.* | | | | |
| Dalby ... ... | 1·39 | 46 | 0·03 | 0·80 |
| Emu Vale ... ... | 1·28 | 20 | 0·11 | 0·79 |
| Jimbour ... ... | 1·35 | 28 | Nil | 0·49 |
| Miles ... ... | 1·77 | 31 | 0·06 | 0·13 |
| Stanthorpe ... | 2·05 | 43 | 0·15 | 0·94 |
| Toowoomba ... | 2·43 | 44 | 0·37 | 0·45 |
| Warwick ... ... | 1·77 | 29 | Nil | 0·45 |
| *Maranoa.* | | | | |
| Roma ... ... | 1·64 | 42 | Nil | Nil |
| *State Farms, &c.* | | | | |
| Bungeworgorai ... | 0·65 | 4 | 0·02 | Nil |
| Gatton College ... | 2·07 | 17 | 0·15 | 0·30 |
| Gindie ... ... | 1·21 | 17 | 0·10 | Nil |
| Hermitage ... | 1·48 | 10 | 0·02 | 0·76 |
| Kairi ... ... | 1·69 | 4 | 2·95 | 1·34 |
| Kamerunga ... | 4·41 | 28 | 2·55 | 3·31 |
| Sugar Experiment Station, Mackay | 3·76 | 19 | 2·99 | 2·91 |
| Warren ... ... | 0·37 | 4 | 0·17 | 0·06 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for May this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

# ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

## TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON.

| 1917. | MAY. | | JUNE. | | JULY. | | AUGUST. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·13 | 5·17 | 6·32 | 4·59 | 6·40 | 5·4 | 6·30 | 5·18 |
| 2 | 6·13 | 5·16 | 6·32 | 4·59 | 6·40 | 5·4 | 6·30 | 5·18 |
| 3 | 6·14 | 5·15 | 6·33 | 4·59 | 6·40 | 5·4 | 6·29 | 5·19 |
| 4 | 6·15 | 5·14 | 6·33 | 4·59 | 6·40 | 5·5 | 6·29 | 5·19 |
| 5 | 6·15 | 5·14 | 6·33 | 4·59 | 6·40 | 5·5 | 6·28 | 5·20 |
| 6 | 6·16 | 5·13 | 6·34 | 4·59 | 6·40 | 5·5 | 6·28 | 5·20 |
| 7 | 6·15 | 5·12 | 6·34 | 4·59 | 6·40 | 5·6 | 6·27 | 5·21 |
| 8 | 6·17 | 5·12 | 6·34 | 4·59 | 6·40 | 5·6 | 6·26 | 5·21 |
| 9 | 6·17 | 5·11 | 6·35 | 4 59 | 6·40 | 5·6 | 6 25 | 5 22 |
| 10 | 6·18 | 5·11 | 6·35 | 4·59 | 6 39 | 5·7 | 6·24 | 5·22 |
| 11 | 6·19 | 5·10 | 6·35 | 5 0 | 6·39 | 5·7 | 6·23 | 5·23 |
| 12 | 6·20 | 5·9 | 6·36 | 5·0 | 6·39 | 5·8 | 6 22 | 5·23 |
| 13 | 6·21 | 5·9 | 6·36 | 5·0 | 6·39 | 5·8 | 6 21 | 5 24 |
| 14 | 6·21 | 5·8 | 6·36 | 5·0 | 6·39 | 5·9 | 6·20 | 5·24 |
| 15 | 6·22 | 5·8 | 6·36 | 5 0 | 6·38 | 5·9 | 6·19 | 5·25 |
| 16 | 6·23 | 5·7 | 6·37 | 5·0 | 6·38 | 5·10 | 6·18 | 5·25 |
| 17 | 6·23 | 5·7 | 6·37 | 5·0 | 6·38 | 5·10 | 6·17 | 5·26 |
| 18 | 6·24 | 5·6 | 6·37 | 5·0 | 6·37 | 5·11 | 6·16 | 5·27 |
| 19 | 6·24 | 5·6 | 6·37 | 5·0 | 6 37 | 5·11 | 6·15 | 5·27 |
| 20 | 6·25 | 5·5 | 6·38 | 5·0 | 6 36 | 5·12 | 6·14 | 5·28 |
| 21 | 6·25 | 5·5 | 6·38 | 5·1 | 6 36 | 5·12 | 6·13 | 5·28 |
| 22 | 6·26 | 5·4 | 6·38 | 5·1 | 6·35 | 5·13 | 6·12 | 5·29 |
| 23 | 6·27 | 5·3 | 6·38 | 5·1 | 6·35 | 5·13 | 6·11 | 5·29 |
| 24 | 6·27 | 5·3 | 6·38 | 5·1 | 6·34 | 5·14 | 6·10 | 5·30 |
| 25 | 6·28 | 5·2 | 6·39 | 5·2 | 6 34 | 5·14 | 6·9 | 5·30 |
| 26 | 6·29 | 5·2 | 6·39 | 5·2 | 6·33 | 5·15 | 6·8 | 5·31 |
| 27 | 6·29 | 5·1 | 6·39 | 5·2 | 6·33 | 5·15 | 6·7 | 5·31 |
| 28 | 6·30 | 5·1 | 6·39 | 5·3 | 6·32 | 5·16 | 6·6 | 5·32 |
| 29 | 6·30 | 5·0 | 6·39 | 5·3 | 6 32 | 5·16 | 6·5 | 5·32 |
| 30 | 6·31 | 5·0 | 6·39 | 5·3 | 6·31 | 5·17 | 6·4 | 5·33 |
| 31 | 6·31 | 4·59 | ... | ... | 6·31 | 5·17 | 6·3 | 6·33 |

The times given are for the whole of Queensland, New South Wales, and Victoria, where the same Standard Time is observed.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 7 May | ○ | Full Moon | 12 | 43 | p.m. |
| 14 „ | ☽ | Last Quarter | 11 | 48 | a.m. |
| 21 „ | ● | New Moon | 10 | 47 | „ |
| 29 „ | ☾ | First Quarter | 9 | 33 | „ |

The Moon will be nearest the earth on the 14th, and at its farthest distance on the 28th.

| | | | | | |
|---|---|---|---|---|---|
| 5 June | ○ | Full Moon | 11 | 7 | p.m. |
| 12 „ | ☽ | Last Quarter | 4 | 38 | „ |
| 19 „ | ● | New Moon | 11 | 2 | „ |
| 28 „ | ☾ | First Quarter | 2 | 8 | a.m. |

The Moon will be nearest the earth on the 9th, and at its farthest distance on the 25th. It will cause a partial Eclipse of the Sun on the 19th, visible in the Arctic Regions but not in Australia.

| | | | | | |
|---|---|---|---|---|---|
| 5 July | ○ | Full Moon | 7 | 40 | a.m. |
| 11 „ | ☽ | Last Quarter | 10 | 12 | p.m. |
| 19 „ | ● | New Moon | 1 | 0 | „ |
| 27 „ | ☾ | First Quarter | 4 | 40 | „ |

The moon will be nearest the earth on the 7th, and at its greatest distance on the 22nd. There will be a *Total Eclipse* of the *Moon* from 6·51 to 8·27 a.m. on the 5th; but only the moon's entrance into the shadow of the earth will be seen in Eastern Australia.

| | | | | | |
|---|---|---|---|---|---|
| 3 Aug. | ○ | Full Moon | 3 | 11 | p.m. |
| 10 „ | ☽ | Last Quarter | 5 | 56 | a.m. |
| 18 „ | ● | New Moon | 4 | 21 | „ |
| 26 „ | ☾ | First Quarter | 5 | 8 | „ |

The moon will be nearest the earth on the 4th, and at its greatest distance on the 18th.

* For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during May, June, and July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

* These notes will not again be published until September, as they apply to the series from May to August.

# Farm and Garden Notes for August.

This and the following two months are about the busiest periods of the year so far as work in the field is concerned; and the more activity now displayed in getting in the summer crops, the richer will be the reward at harvest time. Potatoes should be planted, taking care to select only good sound seed that has sprouted. This will ensure an even crop. Yams, arrowroot, ginger, sisal hemp, cotton, and sugar-cane may now be planted. Sow maize for an early crop. If the seed of prolific varieties is regularly saved, in the end it will not be surprising to find from four to six cobs on each stalk. This has been the experience in America, where the selecting of seeds has been reduced to fine art.

In choosing maize for seed, select the large, well-filled, flat grains. It has been shown that, by constantly selecting seed from prolific plants, as many as five and six cobs of maize can be produced on each stalk all over a field. A change of seed from another district is also beneficial. Sow pumpkins, either amongst the maize or separately, if you have the ground to spare. Swede turnips, clover, and lucerne may be sown, but they will have to contend with weeds, which will begin to vigorously assert themselves as the weather gets warmer; therefore, keep the hoe and cultivator constantly going in fine weather. Tobacco may be sown during this month. If vines are available, sweet potatoes may be planted towards the end of the month. In this case also it is advisable to avoid too frequent planting of cuttings from the old vines: and to obtain cuttings from other districts. If grasses have not yet been sown, there is still time to do so, if the work be taken in hand at once. Sugar-cane crushing will now be in full swing, and all frosted cane in the Southern district should be put through the rollers first. Plough out old canes, and get the land in order for replanting. Worn-out sugar lands in the Central and Northern districts, if not intended to be manured and replanted, will bear excellent crops of sisal hemp. Rice and coffee should already have been harvested in the North. The picking of Liberian coffee, however, only begins this month. Collect divi-divi pods. Orange-trees will be in blossom, and coffee-trees in bloom for the second time. As this is generally a dry month in the North, little can be done in the way of planting.

*Kitchen Garden.*—Nearly all spring and summer crops can now be planted. Here is a list of seeds and roots to be sown, which will keep the market gardeners busy for some time: Carrots, parsnips, turnip, beet, lettuce, endive, salsify, radish, rhubarb, asparagus, Jerusalem artichoke, French beans, runner beans of all kinds, peas, parsley, tomato, egg-plant, sea-kale, cucumber, melon, pumpkin, globe artichokes. Set out any cabbage plants and kohl-rabi that are ready. Towards the end of the month plant out tomatoes, melons, cucumbers, &c., which have been raised under cover. Support peas by sticks or wire-netting. Pinch off the tops of broad beans as they come into flower to make the beans set. Plough or dig up old cauliflower and cabbage beds, and let them lie

in the rough for a month before replanting, so that the soil may get the benefit of the sun and air. Top dressing, where vegetables have been planted out, with fine stable manure has a most beneficial effect on their growth, as it furnishes a mulch as well as supplies of plant food.

*Flower Garden.*—All the roses should have been pruned some time ago, but do not forget to look them over occasionally, and encourage them in the way they should go by rubbing off any shoots which tend to grow towards the centre. Where there is a fine young shoot growing in the right direction, cut off the old parent branch which it will replace. If this work is done gradually it will save a great deal of hacking and sawing when next pruning season arrives. Trim and repair the lawns. Plant out antirrhinums (snapdragon), pansies, hollyhocks, verbenas, petunias, &c. Sow zinnias, amaranthus, balsam, chrysanthemum, marigolds, cosmos, coxcombs, phloxes, sweet peas, lupins; and plant gladiolus, tuberoses, amaryllis, pancratium, ismene, crinums, belladonna, lily, and other bulbs. In the case of dahlias, however, it will be better to place them in some warm moist spot, where they will start gently and be ready to plant out in a month or two. It must be remembered that this is the driest of our months. During thirty-eight years the average number of rainy days in August was seven, and the mean average rainfall was 2·63 inches, and for September 2·07 inches, increasing gradually to a rainfall of 7·69 inches in February.

# Orchard Notes for August.

## THE SOUTHERN COAST DISTRICTS.

The remarks that have appeared in these notes during the last few months respecting the handling and marketing of citrus fruits apply equally to the present month. The bulk of the fruit, with the exception of the latest ripening varieties in the latest districts, is now fully ripe, and should be marketed as soon as possible, so that the orchards can be got into thorough order for the spring growth. All heavy pruning should be completed previous to the rise in the sap; and where winter spraying is required, and has not yet been carried out, no time should be lost in giving the trunks, main branches, and inside of the trees generally a thorough dressing with the lime and sulphur wash.

Where there are inferior sorts of seedling citrus trees growing, it is advisable to head same hard back, leaving only the main trunk and four or five well-balanced main branches cut off at about 2 ft. from the trunk. When cut back, give a good dressing with the lime and sulphur wash. Trees so treated may either be grafted with good varieties towards the end of the month or early in September; or, if wished, they may be allowed to throw out a number of shoots, which should

be thinned out to form a well-balanced head, and when large enough should be budded with the desired variety.

Grafting of young stock in nursery, not only citrus but most kinds of deciduous fruits, can be done this month. It comes in useful in the case of stocks that have missed in budding, but for good, clean grown stocks budding is to be preferred.

In the case of working our Seville orange stocks to sweet oranges, grafting is, however, preferable to budding, as the latter method of propagation is frequently a failure. The Seville stock should be cut off at or a little below the surface of the ground. If of small size, a single tongue graft will be sufficient; but if of large size, then the best method is the side graft—two or more grafts being placed in each stock, so as to be certain of one taking. In either case the grafts are tied firmly in place, and the soil should be brought round the graft as high as the top bud. If this is done, there will be few missed, and undesirable Seville stocks can be converted into sweet oranges.

In selecting wood for grafting, take that of the last season's growth that has good full buds and that is well matured; avoid extra strong or any poor growths.

Seville oranges make good stocks for lemons. In case it is desirable to work them on to lemons, it is not necessary to graft below ground, as in the case of the sweet orange, but the stock can be treated in the same manner as that recommended in the case of inferior oranges—viz., to head hard back, and bud on the young shoots.

Where orchards have not already been so treated, they should now be ploughed so as to break up the crust that has been formed on the surface during the gathering of the crop, and to bury all weeds and trash. When ploughed, do not let the soil remain in a rough, lumpy condition, but get it into a fine tilth, so that it is in a good condition to retain moisture for the trees' use during spring. This is a very important matter, as spring is our most trying time, and the failure to conserve moisture then means a failure in the fruit crop to a greater or less extent.

Where necessary, quickly acting manures can be applied now. In the case of orchards, they should be distributed broadcast over the land, and be harrowed or cultivated in; but in the case of pines they should be placed on each side of the row, and be worked well into the soil.

The marketing of pines, especially smooths, will occupy growers' attention, and where it is proposed to extend the plantations the ground should be got ready, so as to have it in the best possible condition for planting, as the thorough preparation of the land prior to planting pines is money very well spent.

The pruning of all grape vines should be completed, and new plantings can be made towards the end of the month. Obtain well-matured, healthy cuttings, and plant them in well and deeply worked land, leaving the top bud level with the surface of the ground, instead of leaving 6 or 7 in. of the cutting out of the ground to dry out, as is often done. You only want one strong shoot from your cutting, and

from this one shoot you can make any shaped vine you want. Just as the buds of the vines begin to swell, but before they burst, all varieties that are subject to black spot should be dressed with the sulphuric acid solution—viz., three-quarters of a pint of commercial sulphuric acid to one gallon of water; or, if preferred, this mixture can be used instead —viz., dissolve 5 lb. of sulphate of iron (pure copperas) in one gallon of water, and when dissolved add to it half a pint of sulphuric acid.

## THE TROPICAL COAST DISTRICTS.

Bananas should be increasing in quality and quantity during the month, and though, as a rule, the fruit fly is not very bad at this time of the year, still it is advisable to take every care to keep it in check. No over-ripe fruit should be allowed to lie about in the gardens, and every care should be taken to keep the pest in check when there are only a few to deal with, as, if this is done, it will reduce the numbers of the pest materially later on in the season. The spring crop of oranges and mandarins will be now ready for marketing in the Cardwell, Tully, Cairns, and Port Douglas districts. For shipping South see that the fruit is thoroughly sweated, as unless the moisture is got rid of out of the skins the fruit will not carry. Should the skins be very full of moisture, then it will be advisable to lay the fruit on boards or slabs in the sun to dry; or, if this is not possible, then the skin of the fruit should be artificially dried by placing same in a hot chamber, as the moisture that is in the skin of our Northern-grown citrus fruits must be got rid of before they will carry properly.

Papaws and granadillas should be shipped South, and the markets tested. If carefully packed in cases holding only one layer of fruit, and sent by cold storage, these fruits should reach their destination in good order. Cucumber and tomato shipments will be in full swing from Bowen. Take care to send nothing but the best fruit, and don't pack the tomatoes in too big cases, as tomatoes always sell on their appearance and quality.

## THE SOUTHERN AND CENTRAL TABLELANDS.

All fruit-tree pruning should be finished during the month, and all trees should receive their winter spraying of the lime and sulphur wash.

All new planting should be completed, orchards should be ploughed and worked down fine, and everything got ready for spring.

In the warmer parts, grape pruning should be completed, and the vines should receive the winter dressing for black spot. In the Stanthorpe district grape pruning should be delayed as late as possible, so as to keep the vines back, as it is not early but late grapes that are wanted, and the later you can keep your vines back the better chance they have of escaping spring frosts.

Towards the end of the month inferior varieties of apples, pears, plums, &c., should be worked out with more desirable kinds; side, tongue, or cleft grafting being used. In the case of peaches, almonds, or nectarines, head back and work out by budding on the young growth.

## QUEENSLAND COTTON PRODUCTION IN 1916.

The total quantity of raw cotton dealt with at the State Ginnery in 1916 by the Department of Agriculture and Stock on growers' account was 29,230 lb., from which was obtained 10,066 lb. of prime lint, 18,284 lb. seed, and 880 lb. second-class lint. The number of pounds of seed cotton required to produce 1 lb. of lint was 2·90 lb., and for 1 lb. of seed 1·6 lb. of seed cotton. The percentage of lint to raw cotton was 34·4, and 1 lb. of raw cotton produced ·344 lb. of lint. The lint was sold locally, ex Store, at 6·9d. per lb., the best lint bringing 7d. per lb. The seed was purchased by the Department for redistribution to farmers for planting during 1917. After deducting ginning expenses, the growers received a net return of 2/54d. per lb. for their seed cotton, which at the average of 1,000 lb. of seed cotton per acre was equal to a gross return of £10 11s. 8d. per acre. Deducting the expenses of raising and picking a 1,000-lb. crop, the net return was £7 14s. 9d. per acre. The picking cost averaged £2 1s. 8d. per acre, and where the grower kept the cost of picking in his own family, he saved this cash outlay.

How does this compare with maize-growing? A 40-bushel crop at 2s. 3d. per bushel in a good season gives a net profit of £2 18s. 4d. per acre. Of all our ordinary farm crops, rice is the only one which can compete in value with cotton. An acre of rice producing 30 bushels is worth £6 for grain (probably more in these war times) and the same for the straw. It costs over £3 to produce an acre of rice, the net profit being £8 16s. 3d. The net profit on wheat on the same basis and including straw is about £2 16s. when wheat is selling at 3s. per bushel. On barley it is about £3, and on maize, with a 30-bushel crop, £2 3s. And over all these crops, cotton presents the additional advantage of less labour in harvesting, and in keeping qualities owing to its freedom from weevils or other troublesome insects.

### THE FUTURE DEMAND FOR COTTON.

With regard to the future demand for cotton, it must be remembered that of the world's population of 1,500,000,000, about 500,000,000 regularly wear clothes; about 750,000,000 are partially clothed, and 250,000,000 go quite naked, with, in many tropical countries, the small addition of a cotton loin-cloth. Now to clothe the entire population of the world would require 42,000,000 bales of 500 lb. each annually. It is highly improbable that the supply of cotton will ever exceed the demand, and we have to-day evidence that, owing to the war, and the great demand for cotton for explosives, the supply of cotton is very considerably below requirements. There is a sensible diminution in the United States of America, owing to a bad season and the ravages of the boll weevil,

amounting to a fall from 15,000,000 to 13,000,000 bales, with the result that the price of cotton has risen from 7d. per lb. to 16d. per lb. A year or two after the American Civil War, during which 14,000 acres were under cotton in Queensland, bringing 3d. per lb. for seed cotton and 1s. to 1s. 2d. per lb. in the Liverpool market, it was found that cotton was the most payable crop the farmer could grow, even had the price of cotton fallen to 8d. or 9d. per lb. in the home markets. Unfortunately for the industry in Queensland, American cotton fell as low as 4½d. per lb., and the result was that at that price cotton growing anywhere except in a black labour or slave country became out of the question.

To-day, however, with cotton likely to remain at a high price during and after the war, those who are wavering in their ideas concerning the future of cotton—that is to say, who are in doubt whether prices will keep up or whether there will be such an over-supply that prices will recede to a non-paying point—may take heart of grace and plant with good prospects before them.

The Department of Agriculture and Stock advances 1¾d. on all cotton sent to the State ginning establishment, William street, Brisbane, and all profit derived from the sale, less actual expenses, will be paid to the growers.

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QUEENSLAND AGRICULTURAL JOURNAL

VOL. VIII. AUGUST, 1917. PART 2.

# Agriculture.

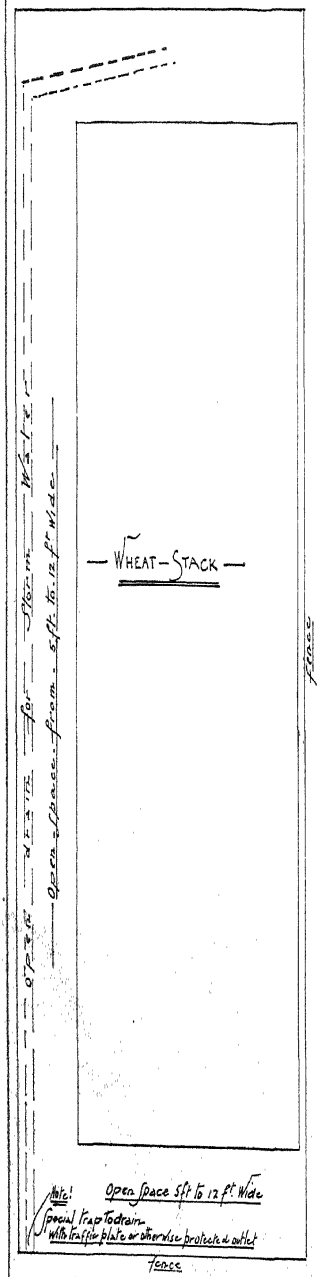
## PRODUCTS OF THE MAIZE PLANT.

Of the multifarious products obtained from all parts of the maize plant in Europe, the United States of America, and other countries of the world, Australia produces but two—cornflour and horse-feed (either grain or green, or in the form of ensilage). In 1914, 176,372 acres were under maize in Queensland, which yielded 4,260,673 bushels of grain. The maize harvest in the following year was a poor one, amounting to a little over 2,000,000 bushels. Taking the cob as representing 18 per cent. of the ear, it will be seen what a vast quantity of cobs has been produced only to be destroyed as valueless. Now these cobs have a very considerable value as stock food, as has long ago been demonstrated in the long-continued general experience of American farmers. Apart from this, a ton of ordinary wood when burnt only gives 100 lb. of potash, 32 lb. of phosphoric acid, and 640 lb. of lime. But a ton of corn cobs burnt into ash gives 500 lb. of potash, 90 lb. of phosphoric acid, and 140 lb. of lime. So much for the manurial value of the cobs.

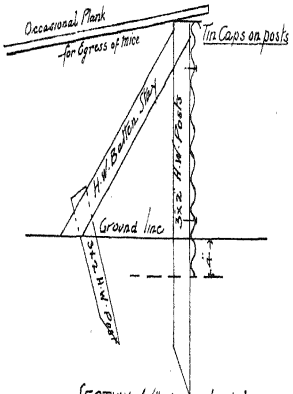
What are we losing in the way of other products of the maize plant? Generally speaking, people have no idea of the thousand and one ways in which the Americans utilise maize. This plant is to them more precious than is the bamboo to the Orientals. The pith of the stalk

# — Detail-Drawing-of-Mouse-Proof-Fence —

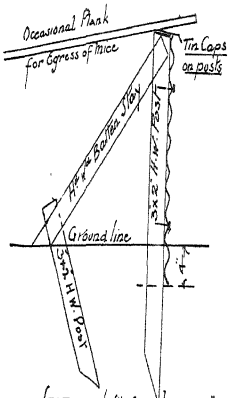
## — Around Wheat Stacks —



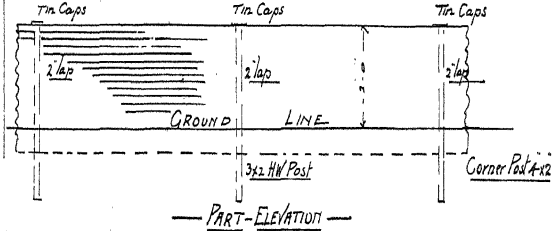

— Block Plan —
— 1/8th Scale —



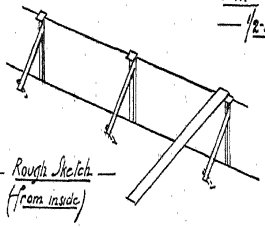

— Section (with fence plumb) —
— Inch Scale —



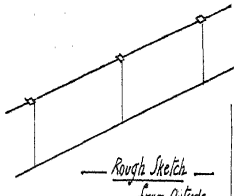

— Section (with fence leaning 2" Outward) —
— Inch Scale —
— Alternative —




— Part Elevation —
— 1/2 Inch Scale —



— Rough Sketch —
(From inside)



— Rough Sketch —
From Outside

is converted into cellulose, which is utilised in the manufacture of smokeless powder and other high explosives in vast demand during the present war. Cellulose is largely used for packing cofferdams and belting of battleships; pyroxiline varnish is a liquid made from cellulose, the uses of which are practically unlimited. The pith is used as an insulating material in refrigerating chambers and cars, ships' holds, electric dry batteries, and as casing for pipes of steam generators. It also enters largely into the manufacture of a washable floor cloth superior to linoleum.

Besides being put to these uses, the pith of the maize stalk is used in enormous quantities in dynamite factories under the name of "wood meal."

Out of the spathes or husks covering the cob is produced a material which, in America, is utilised to manufacture various tissues, straw mats and hats, and, above all, a tough parchment paper for envelopes and bank notes. Every part of the plant can be utilised. The stalks and leaves are used in a thousand industries.

Besides starch, another product of the grain is dextrine for fixing the colours in cloth. Whisky, eau-de-cologne, &c., are distilled from it. Enormous quantities of glucose are manufactured from maize, and this actually finds its way to the tables of fashionable America under the name of golden syrup.

The grain is also made to produce a bright, tasteless oil, which is largely used in adulterating olive and cod-liver oil.

Finally, rubber is extracted from it by vulcanising the oil.

Briefly, every conceivable product is obtained from maize except crystallisable sugar, as maize sugar will not granulate, for which reason it is made into golden syrup.

The finest book paper can be made out of the stalks.

All these products have for years been left to rot in the fields of Queensland farmers. Not even have any farmers utilised the cobs by grinding them into stock food as is done in America. When shall we wake up to a sense of the hidden wealth in our Queensland products, and come to the front with these products as do the Americans?

---

## PROTECTING WHEAT STACKS FROM MICE.

In response to a request from the Department of Agriculture and Stock, Brisbane, for information in regard to the methods adopted in New South Wales for destroying mice in wheat stacks, Mr. G. Valder, Under Secretary and Director, Department of Agriculture in the

Southern State, has courteously supplied the following information on the subject:—The stacks are being protected by means of mice-proof galvanised iron fences, and various methods for the destruction of the mice within the stacks are being used, such as kerosene tins half full of water laid in the ground to act as traps; also poison, where it can be safely used, and means of allowing the mice to leave the stack over the fence without being able to return to it. Mr. Valder also forwarded a sketch showing the method of erecting the fence which is here reproduced. The cost of galvanised iron has been considerably advanced since the rise in price of metals during the war, but second-class iron, even perforated by nail holes, would prevent the mice from getting through. New iron is quoted at from £70 to £81 per ton. Second-hand with nail holes 5s. 2d. per sheet.

### COTTON SEED FOR DISTRIBUTION.

Cotton-ginning at the Department of Agriculture and Stock commenced last month, and seed will be supplied to intending planters gratis on application to the Under Secretary, stating what area the applicant intends to plant. In July, 1916, the total quantity of cotton purchased by the Department from farmers was 29,500 lb. In the same month of 1917 the quantity purchased was 59,000 lb. and consignments were still coming in.

## MARKET GARDENING.

### A NEW METHOD OF SELECTING TOMATOES FOR RESISTANCE TO THE WILT DISEASE.

By C. W. EDGERTON.

Perhaps the most serious disease of tomatoes in the southern United States is that caused by *Fusarium lycopersici*, commonly known as the tomato wilt. The fungus lives in the soil and attacks plants through the roots, later growing up through the fibrovascular bundles into the stems. In this, as in similar diseases, the only practical method of control now known is in the use of varieties, or strains, that are resistant to the disease. By saving seed from healthy plants in a badly infected field for several seasons, strains can be obtained which show considerable resistance to the disease. This method has, however, several drawbacks: (1) Many of the plants in the field do not come in contact with the wilt

fungus during the season and so do not have a chance to show whether they are resistant to the disease; (2) resistant plants in the field are readily pollinated by the susceptible plants; (3) the time necessary to obtain a wilt resistant strain is too long.

To avoid all these drawbacks, the writer has tried to improve on the old method by selecting resistant plants from the seed bed.

In ordinary unsterilised soil, even if it is heavily inoculated with the tomato wilt fungus, not many of the plants will show the wilt to any extent before it is time to place them in the field. The presence of bacteria and other fungi seems to have an inhibitory effect on the wilt fungus. If, however, the soil is first sterilised by heat and then heavily inoculated with the wilt fungus just before planting, the disease will develop so well that all the plants will be attacked and the most susceptible will be killed before they are large enough to be placed in the field. This guarantees the degree of resistance of the surviving plants which are placed in the field.

To show how this method works in practice, results of some experiments may be briefly given. Having by the old method of selection obtained a strain that showed considerable resistance to the wilt disease, this was compared by the seed-bed method with three standard varieties of tomatoes. The seeds of each variety were planted side by side in reinoculated sterilised soil. Different cultures of the fungus from different localities were also used in order to see if they would affect the varieties differently. In the following table are given the percentage of living plants and of wilt-free plants of each variety sixty-eight days after planting.

| Variety. | CULTURE A. | | CULTURE B. | | CULTURE C. | | CULTURE D. | |
|---|---|---|---|---|---|---|---|---|
| | Living. | Healthy. | Living. | Healthy. | Living. | Healthy. | Living. | Healthy. |
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| "Stone" .. .. | 35·3 | 11·8 | 75·0 | 55·0 | 44·7 | 25·5 | 71·4 | 57·1 |
| "Acme" .. .. | 14·3 | 0·0 | 42·9 | 28·6 | 31·3 | 21·9 | 65·8 | 31·6 |
| "Earlianna" .. | 32·3 | 3·2 | 63·5 | 36·5 | 37·3 | 17·7 | 96·0 | 70·0 |
| Wilt-resistant .. | 62·5 | 31·3 | 81·8 | 56·8 | 68·2 | 34·1 | 95·1 | 78·0 |

This table shows the comparatively greater resistance of the wilt-resistance variety as compared to the others, and it also shows the large percentage of susceptible plants that could be eliminated before setting in the field.—"Bull. of Foreign Agric. Intelligence," October, 1916, Department of Agric., Ottawa.

## OLD *VERSUS* NEW SEED.

Fresh seed usually germinates more promptly than old seed, although there may be advantages in sowing old seed. Many gardeners claim that fresh seed of the cucurbits (melons, pumpkins, cucumbers, gherkins, &c.) tends to produce more vine and leaf and less fruit than seed several years old. But fresh seed is generally preferred, especially in the case of the onion and parsnip when the vitality of the seed is low. As far as pumpkins and cucumbers are concerned, we have obtained excellent crops from seed two years old, and also from melon seeds (the Rockyford musk melon) imported from America, some of the seed of which was sown more than two years afterwards and the vines bore heavily. The life of seeds depends upon (1) the kind of vegetables, (2) conditions under which they were grown, (3) thoroughness of curing, (4) storage conditions.

There is a common belief among growers of pumpkins that to get the best results, new seed should not be used; it should be two or three years old. And there is scientific evidence to support that belief. The tendency is for seeds to give less vigorous development as they are old; in other words, their vegetable capacity decreases. Plants raised from fresh seed tend toward a more robust growth than do plants from older seed.

A New South Wales departmental expert mentions an actual case where a trial was made between new and old pumpkin seed. The plants grown from new seed were the largest and strongest; those from old seed came later, and were weaker plants, but returned a much larger yield in fruit. In this trial the strong barren plants were nipped back, and the laterals that developed carried a much better supply of fruiting flowers.

There is other evidence to show that if the original stems grow vigorously and unchecked, they tend to throw mainly male (pollen-bearing) flowers; but that if the ends be pinched off when young, only four or five leaves being left, lateral branches will come away, on which the proportion of fruiting (female) flowers will be much greater.

This seems to bear out the statement that strong vines may tend to fruit indifferently, whereas weaker plants, or plants that have suffered a check, produce many fruiting flowers, and, consequently, give a much better return in fruit.

Mr. F. F. Coleman, Inspector under the Pure Seed Act, Department of Agriculture and Stock, Queensland, when on a visit to M. Vilmorin's establishment in France, found that experiments had been made there with cucumber seeds ten years old, and such seeds produced vines laden

with fruit. M. Vilmorin did not continue his experiments, as he considered enough had been done to show that very old cucurbit seed was even more productive than fresh seed, and Mr. Coleman had personally verified this by growing cucumbers from ten-year-old seed.

The following table given in R. L. Watts's (Professor of Horticulture in the Pennsylvania, U.S.A.) excellent work on "Vegetable Gardening" shows the maximum ages of properly cured and stored vegetable seeds when they will be likely to germinate satisfactorily. But he remarks that it is not best to place too much reliance upon tables of this character, the only certain means of determining the vitality of seeds being to make germination tests:—

| Seed. | Years. | Seed. | Years. |
|---|---|---|---|
| Artichoke | 2 | Musk melon (rock melon) | 5 |
| Asparagus | 2 | Okra | 4 |
| Bean | 3 | Onion | 1 |
| Beet | 4 | Parsley | 1 |
| Cabbage | 3 | Parsnip | 1 |
| Carrot | 1 | Pea | 3 |
| Cauliflower | 4 | Pepper | 3 |
| Celery | 2 | Radish | 2 |
| Cucumber | 5 | Salsify | 2 |
| Egg plant | 5 | Squash (pumpkin) | 3 |
| Endive | 2 | Tomato | 5 |
| Kale | 2 | Turnip | 4 |
| Kohl-rabi | 3 | Water melon | 5 |
| Leek | 3 | | |
| Lettuce | 4 | | |

## LAYING OUT A SMALL ORCHARD.

If the land is laid out in equilateral triangles, more trees may be planted to the acre than on the square system. By the former arrangement half an acre will carry 97 trees, whereas by the latter only 85 trees can be planted. There is a further advantage gained by the triangular or, as it is called, the septupal system, which is, that the land can be cultivated in three different directions, a great consideration is these days of high cost of labour.

# Pastoral.

## BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| P. Young .. .. | Talgai West, Ellinthorp | 2 | 42 | Milking Shorthorn Herd Book of Queensland |
| L. H. Paten .. .. | "Jeyendel," Calvert, S. & W. Line | 8 | 21 | Ayrshire Herd Book of Queensland |
| F. C. G. Gratton .. | "Towleston," Kingsthorpe | 2 | 14 | Holstein Cattle Club Herd Book |
| T. Mullen .. .. | "Norwood," Chelmer | 3 | 20 | Queensland Jersey Herd Book |
| J. H. Paten .. .. | Yandina .. .. | 6 | 21 | Ayrshire Herd Book of Queensland |
| Queensland Agricultural College | Gatton .. .. | 2 | 6 | Ayrshire Herd Book of Queensland |
| | | 2 | 3 | Holstein-Friesian Herd Book of Australia |
| | | 3 | 13 | Jersey Herd Book of Queensland |
| J. W. Paten .. .. | Wanora, Ipswich .. | 10 | 42 | Ayrshire Herd Book of Queensland |
| M. W. Doyle .. .. | Moggill .. .. | 4 | 12 | Queensland Jersey Herd Book |
| G. A. Buss .. .. | Bundaberg .. .. | 1 | 15 | Herd Book of the Jersey Cattle Society of Queensland |
| W. Rudd .. .. | Christmas Creek, Beaudesert | 2 | 10 | Milking Shorthorn Herd Book of Queensland |
| M. F. and R. C. Ramsay | Talgai, Clifton .. | 5 | 27 | Herd Book of the Jersey Cattle Society of Queensland |
| George Newman .. | Wyreema .. .. | 9 | 37 | Holstein-Friesian Herd Book of Australia |

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| R. Conochie .. .. | Brooklands, Tingoora | 9 | 21 | Queensland Jersey Herd Book |
| W. J. Barnes .. .. | Cedar Grove .. | 10 | 37 | Queensland Jersey Herd Book |
| T. B. Murray-Prior .. | Maroon, Boonah .. | 2 | 37 | Queensland Shorthorn and Australian Herd Books |
| W. J. Affleck .. .. | Grasmere, N. Pine .. | 6 | 31 | Queensland Jersey Herd Book |
| A. J. McConnel .. | Dugandan, Boonah | 19 | 36 | Australian Hereford Herd Book |
| A. Pickels .. .. | Blackland's Stud Farm, Wondai | 4 | 62 | Illawarra Dairy Cattle Herd Book of Queensland |
| G. C. Clark .. .. | East Talgai, Ellinthorp | 3 | 7 | New Zealand Herd Book |
| H. D. B. Cox .. .. | Sydney (entered brother's name) | 3 | 16 | Commonwealth Standard Jersey Herd Book |
| J. T. Perrett and Son | Coolabunia .. .. | 2 | 36 | Illawarra Herd Book of Queensland |
| State Farm .. .. | Kairi .. .. | 4 | 8 | Ayrshire Herd Book of Queensland |
| | | 1 | 2 | Holstein-Frisian Herd Book of Australia |
| E. M. Lumley Hill .. | Bellevue House, Bellevue | 45 | 127 | Australian Hereford Herd Book |
| W. F. Savage .. .. | Ramsay .. .. | 1 | 12 | Illawarra Herd Book of Queensland |
| Tindal and Son .. | Gunyan, Inglewood | 50 | 400 | Australian Hereford Herd Book |
| J. N. Waugh and Son | Prairie Lawn, Nobby | 3 | 28 | Queensland Jersey Herd Book |
| J. H. Fairfax .. .. | Marinya, Cambooya (2) | 9 | 55 | Ayrshire Herd Book of Queensland |
| C. E. McDougall .. | Lyndhurst Stud, Warwick (2) | 25 | 100 | Queensland Shorthorn Herd Bock |
| J. Holmes .. .. | "Longlands," Pittsworth | 6 | 20 | Ayrshire Herd Book of Queensland |
| P. Biddles .. .. | Home Park, Netherby | 1 | 20 | Illawarra Dairy Cattle Association |
| A. Rodgers .. .. | Torran's Vale, Lanefield | 1 | 9 | Milking Shorthorn Herd Book |
| R. S. Alexander .. | Glenlomond Farm, Coolumboola | 1 | .. | Holstein-Frisian Herd Book of Queensland |
| State Farm .. .. | Warren .. .. | 3 | 83 | Ayrshire Herd Book of Queensland |
| S. H. Hosking .. .. | Toogooloowah .. | 2 | 15 | Holstein Cattle Club Herd Book |
| W. J. H. Austin .. | Hadleigh Jersey Herd, Boonah | 1 | 2 | Queensland Jersey Herd Book |
| Ditto .. .. | ditto .. .. | .. | 6 | Commonwealth Standard Herd Book |

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH MAY TO 26TH JUNE, 1917.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Lady Margaret | Ayrshire ... ... | 14 Sept., 1916 | 734 | 4·6 | 39·78 | |
| Lady Melba | Holstein .. ... | 14 Feb., 1917 | 934 | 3·5 | 37·84 | |
| Miss Betty | Jersey ... ... | 27 Mar. ,, | 546 | 5·0 | 32·23 | |
| Snowflake .. | Shorthorn... ... | 17 May ,, | 568 | 4·6 | 30·78 | |
| Iron Plate ... | Jersey ... ... | 9 Dec., 1916 | 484 | 5·3 | 30·32 | |
| Miss Edition | ,, ... ... | 25 Dec. ,, | 484 | 5·2 | 29·72 | |
| Miss Security | ,, ... ... | 27 Mar., 1917 | 625 | 3·9 | 28·66 | |
| Lady Loch II. | Ayrshire ... ... | 3 June ,, | 500 | 4·6 | 27·10 | |
| Skylark ... | ,, ... | 24 May ,, | 605 | 3·8 | 26·95 | |
| Cocoatina ... | Jersey ... ... | 6 Mar. ,, | 526 | 4·2 | 25·97 | |
| Buttercup ... | Shorthorn... ... | 2 June ,, | 646 | 3·4 | 25·66 | |
| Hedges Madge | Holstein ... ... | 22 Mar. ,, | 643 | 3·4 | 25·54 | |
| Lady Annette | Ayrshire ... ... | 11 Nov., 1916 | 369 | 5·8 | 25·33 | |
| Belinda .. | ,, ... ... | 23 Feb., 1917 | 535 | 4·0 | 25·13 | |
| Lady Spec... | ,, ... ... | 17 Jan. ,, | 540 | 3·9 | 24·71 | |
| Violette's Peer's Girl | Jersey ... ... | 13 Dec., 1916 | 343 | 6·0 | 24·37 | |
| Glade ... | Shorthorn... ... | 29 Mar., 1917 | 588 | 3·5 | 24·07 | |
| Comedienne | Jersey ... ... | 24 Nov., 1916 | 366 | 5·3 | 22·91 | |
| Thornton Fairetta | ,, ... ... | 26 May ,, | 272 | 7·0 | 22·59 | |
| Hedges Dutchmaid | Holstein ... ... | 22 Aug. ,, | 365 | 5·0 | 21·53 | |
| Jeanni ... | Ayrshire ... ... | 27 Oct. ,, | 403 | 4·5 | 21·35 | |
| Sylvia II. ... | Shorthorn... ... | 16 Jan., 1917 | 489 | 3·7 | 21·19 | |

The cows were fed on a ration of Japanese millet ensilage, with wheaten and lucerne chaff, in addition to natural pasturage.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JUNE, 1917.

Five thousand nine hundred and seventy-three eggs were laid during the month. The health of the birds has been exceptionally good, not a case of sickness requiring treatment has occurred. Most of the pens which broke into moult during the previous month are now in full lay. Weather on the whole has been good, with the exception of some very cold nights. Only five cases of broodiness have occurred among the heavy breeds, and none among the light breeds during the month. The selection of the birds eligible for the "True to Type" prizes has been made, but the publication of these is reserved for next month, when the weight of eggs will also be given and a full report submitted. Mr. J. M. Manson wins the monthly prize in the light breeds with a score of 197 eggs, while Mr. E. F. Dennis wins in the heavy breeds with 120 eggs. The following are the individual records:—

| Competitors. | Breed. | June. | Total. |
|---|---|---|---|
| LIGHT BREEDS. | | | |
| E. Chester ... ... ... ... ... | White Leghorns ... | 122 | 361 |
| W. Becker... ... ... ... ... | Do. ... ... | 97 | 307 |
| *G. H. Turner ... ... ... | Do. ... ... | 127 | 303 |
| Oaklands Poultry Farm ... ... ... | Do. ... ... | 104 | 288 |
| W. R. Crust ... ... ... ... | Do. ... .. | 92 | 279 |
| A. H. Padman, S.A. ... ... ... | Do. ... ... | 93 | 270 |
| G. Chester ... ... ... ... ... | Do. ... ... | 74 | 269 |
| T. A. Pettigrove, Victoria ... .. | Do. ... ... | 96 | 266 |
| *J. Zahl ... ... ... .. | Do. ... ... | 104 | 266 |
| T. Taylor ... ... ... ... | Do. ... ... | 97 | 259 |
| *J. R. Wilson ... ... ... ... | Do. ... ... | 85 | 253 |
| F. W. Leney ... ... ... ... | Do. ... ... | 100 | 349 |
| *A. W. Bailey ... ... ... ... | Do. ... ... | 92 | 249 |
| T. B. Hawkins ... ... ... .. | Do. ... ... | 75 | 247 |
| Moritz Bros., S.A. ... ... ... | Do. ... ... | 133 | 243 |
| Chris. Porter ... ... ... ... | Do. ... ... | 102 | 243 |
| C. Knoblauch ... ... ... | Do. ... ... | 101 | 234 |
| *A. T. Coomber ... ... ... .. | Do. ... .. | 101 | 227 |
| J. G. Richter ... ... ... .. | Do. ... ... | 98 | 224 |
| Mars Poultry Farm ... ... ... | Do. ... ... | 75 | 222 |
| *J. M. Manson ... ... ... ... | Do. ... ... | 137 | 213 |
| R. Holmes ... ... ... ... | Do. ... ... | 60 | 210 |
| Kelvin Poultry Farm ... ... ... | Do. ... ... | 120 | 207 |
| *Mrs. J. R. D. Munro ... .. .. | Do. ... ... | 89 | 206 |
| A. Shillig ... ... ... ... | Do. ... ... | 107 | 202 |
| Quinn's Post Poultry Farm ... ... | Do. ... ... | 111 | 198 |
| D. Fulton ... ... ... ... . | Do. ... ... | 90 | 197 |
| *Dixie Egg Plant ... ... ... | Do. ... ... | 90 | 190 |
| G. Williams ... ... ... ... | Do. ... ... | 76 | 185 |
| F. Clayton, N.S.W. ... ... ... | Do. ... ... | 73 | 169 |

## EGG-LAYING COMPETITION—*continued.*

| Competitors. | Breed. | June. | Total. |
|---|---|---|---|
| **LIGHT BREEDS—*continued.*** | | | |
| *T. Fanning ... ... ... .. | White Leghorns ... | 82 | 167 |
| J. L. Newton ... ... .. ... | Do. ... ... | 101 | 166 |
| Mrs. W. D. Bradburne, N.S.W. ... | Do. ... ... | 58 | 165 |
| *C. C. Dennis ... ... ... ... | Do. ... ... | 94 | 160 |
| E. Cross .. ... ... ... .. | Do. ... ... | 36 | 157 |
| Miss Hinze ... ... ... ... | Do. ... ... | 80 | 153 |
| L. G. Innis ... ... ... ... | Do. ... .. | 80 | 151 |
| *A. E. Walters ... ... ... ... | Do. ... ... | 103 | 133 |
| J. Holmes ... ... ... ... ... | Do. ... ... | 82 | 134 |
| C. P. Buchanan ... ... ... ... | Do. ... ... | 71 | 131 |
| C. H. Singer ... ... ... .. | Do. ... ... | 33 | 130 |
| G. J. White ... ... ... ... | Do. ... ... | 95 | 128 |
| Mrs J. Carruthers ... ... .. | Do. ... ... | 35 | 126 |
| G. Howard ... ... ... .. | Do. ... ... | 90 | 124 |
| S. C. Chapman ... ... ... ... | Brown Leghorns... .. | 82 | 120 |
| E. A. Smith ... ... ... ... | White Leghorns ... | 58 | 114 |
| J. Ferguson ... ... ... ... | Do. ... ... | 70 | 114 |
| Mrs. S. J. Sear ... ... ... ... | Do. ... ... | 25 | 114 |
| *Dr. E. C. Jennings ... ... ... | Do. ... ... | 56 | 99 |
| **HEAVY BREEDS.** | | | |
| *R. Burns ... ... ... ... ... | Black Orpingtons ... | 116 | 283 |
| A. E. Walters ... ... ... ... | Do. ... ... | 93 | 251 |
| W. Smith ... ... ... ... ... | Do. ... ... | 90 | 249 |
| *Mars Poultry Farm ... ... ... | Do ... ... | 113 | 248 |
| F. A. Claussen ... ... ... | Rhode Island Reds ... | 68 | 245 |
| D. Kenway, N.S.W. ... ... ... | Black Orpingtons ... | 92 | 213 |
| W. S. Hanson, N.S.W. ... ... ... | Do. ... .. | 95 | 211 |
| H. Jobling, N.S.W. ... ... . | Do. ... ... | 52 | 192 |
| Cowan Bros., N.S.W. ... ... ... | Do. ... ... | 90 | 190 |
| P. C. McDonnell, N.S.W. ... ... | Do. ... ... | 97 | 198 |
| *E. F. Dennis ... ... ... ... | Do. .. ... | 120 | 176 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 68 | 162 |
| King and Watson, N.S.W. ... ... | Black Orpingtons ... | 10[illegible] | 147 |
| Mrs. J. H. Jobling, N.S.W. ... ... | Do. ... ... | 65 | 136 |
| *Oaklands Poultry Farm ... ... | Do. ... .. | 38 | 102 |
| C. C. Dennis ... ... .. | White Wyandottes ... | 74 | 98 |
| C. B. Bertelsmeier, S.A. ... ... ... | Black Orpingtons ... | 58 | 90 |
| R. Burns .. ... ... ... | S. L. Wyandottes ... | 8[illegible] | 83 |
| *F. W. Leney ... ... ... | Rhode Island Reds ... | 42 | 80 |
| *Kelvin Poultry Farm ... ... ... | Plymouth Rocks .. | 28 | 70 |
| *E. A. Smith ... ... ... ... | Black Orpingtons ... | 45 | 56 |
| E. Morris ... ... ... ... | Do. ... ... | 27 | 40 |
| J. M. Manson ... ... ... .. | Do. ... .. | 29 | 40 |
| *Miss M. Hinze ... ... ... ... | Do. ... ... | 32 | 33 |
| Totals ... ... ... ... | ... | 5,973 | 13,405 |

* Indicates that the pen is engaged in the single hen test.

RESULTS OF SINGLE HEN TESTS.

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| G. H. Turner ... ... ... | 30 | 52 | 61 | 56 | 47 | 57 | 303 |
| J. Zahl ... ... ... | 52 | 41 | 61 | 17 | 57 | 38 | 266 |
| J. R. Wilson ... ... ... | 44 | 43 | 37 | 44 | 50 | 35 | 253 |
| A. W. Bailey ... ... ... | 35 | 25 | 49 | 48 | 47 | 45 | 249 |
| A. T. Coomber ... ... ... | 46 | 4 | 49 | 47 | 31 | 50 | 227 |
| J. M. Manson ... ... ... | 40 | 30 | 29 | 28 | 36 | 50 | 213 |
| Mrs. J. R. D. Munro ... ... | 64 | 42 | 24 | 27 | 2 | 47 | 206 |
| Dixie Egg Plant ... ... ... | 27 | 37 | 40 | 47 | 39 | 0 | 190 |
| T. Fanning ... ... ... | 6 | 45 | 34 | 33 | 17 | 32 | 167 |
| C. C. Dennis ... ... ... | 31 | 23 | 0 | 32 | 34 | 40 | 160 |
| A. E. Walters ... ... ... | 10 | 20 | 15 | 32 | 39 | 17 | 133 |
| Dr. E. C. Jennings ... ... | 2 | 6 | 13 | 27 | 42 | 9 | 99 |
| R. Burns ... ... ... | 29 | 11 | 58 | 32 | 72 | 81 | 283 |
| Mars Poultry Farm ... ... | 41 | 57 | 32 | 52 | 34 | 32 | 248 |
| E. F. Dennis ... ... ... | 25 | 21 | 43 | 41 | 44 | 2 | 176 |
| Oaklands Poultry Farm... ... | 44 | 2 | 8 | 7 | 41 | 0 | 102 |
| F. W. Leney ... ... ... | 4 | 4 | 0 | 2 | 48 | 22 | 80 |
| Kelvin Poultry Farm ... .. | 21 | 1 | 0 | 47 | 0 | 1 | 70 |
| E. A. Smith ... ... ... | 1 | 0 | 9 | 35 | 10 | 1 | 56 |
| Miss H. Hinze ... ... ... | 9 | 5 | 1 | 10 | 8 | 0 | 33 |

## POULTRY AT THE RANGEVILLE STATE SCHOOL.

We have received from Mr. Thos. Henderson, Head Teacher of the Rangeville State School, the following interesting notes on the instruction given to the scholars in poultry-breeding and egg production. The poultry yard was started in the beginning of the year, and an account of it and its feathered occupants appeared in the issue of the Journal for February, 1917:—

At present one pen of white leghorns is being kept in the Semi-Gordon House. They belong to Mr. R. Holmes, of Harlaxton. Some of the birds are Grantham strain, others champion, and the remainder a cross between Mr. Holmes's birds and Mr. E. A. Smith's, of Paddington, Brisbane.

The six birds laid 107 eggs for the month of May. They are fed on wet mash, which consists of bran, pollard, and desiccated meat mixed up with boiling water until it is quite crumbly and not sticky. Dry mash is also before them in a hopper. The dry mash consists of dry bran and pollard and dried blood. We are feeding these birds on wet mash, owing to a wish expressed by Mr. Holmes, who raised the birds on wet mash, and as a change to dry mash would probably put them off laying. Wheat is fed for grain, and is dug into the scratching material on the floor. The scratching material is horse manure. This has many advantages—(1) The ammonia in the manure eradicates vermin, and the need of a dust bath is thus abolished; (2) the value of the manure is increased for gardening purposes when removed.

Mr. Beard, the Government poultry expert, claims that birds, when fed on wet mash, lay more eggs and also larger eggs than birds which

are fed on dry mash. We, however, prefer dry mash, as it requires less labour and time, is more sanitary, easier handled, and in laying competitions has produced results equally as good as those obtained by feeding on wet mash.

Three trap nests have been installed to show the children how birds in a large pen may be individually tested as layers. When a hen enters a nest a bar drops down, which locks her in until released, and the attendant may see whether she has laid or not. The nests are kept outside the building, and have a hinged roof, which is lifted up to gather the eggs. The water also is kept outside, and the tin has two rectangular holes cut on opposite sides, and a slight draught is caused over the water, and this keeps it cool. The reason for keeping the nests and water outside is for convenience and quickness of attending to these two factors. The birds roost on a perch, under which is suspended a dropping board, which is cleaned every morning. Both perch and dropping board are hung on wires in order to prevent vermin, if any happen to be there, from going from the roosting quarters to the house and *vice versâ*.

Green feed is given every day. It is hung in the middle of the pen, and the fowls eat it as they wish.

Shell grit and crushed-up crockery are supplied in an automatic self-feeding hopper.

The pens are cleaned every morning, and all the work is done by the scholars, whose ages range from 6 to 14.

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## THE FOWL TICK.

Mr. J. Beard, Instructor in the Poultry Industry, Brisbane, has given the following valuable information concerning the Fowl Tick, the symptoms of its presence in the poultry yard, and the remedies for and prevention of its attacks. This information is of very great importance to poultry breeders, and should be carefully studied by our readers who are interested in the industry.

### SYMPTOMS.

Fowls that have been infested by ticks and recover become immune from further attack. This explains the reason why sometimes flocks of fowl are apparently in the best of health and condition, yet, if examined, they will be found to be covered with the larval ticks, and the houses may be found swarming with the pest. If clean fowls are put into these yards they will at once become affected and, in three or four days, the result of tick worry and inoculation by the pest, fever will be at its height. The fowls will appear drooping and listless, the combs becoming quite pale; they then lose the use of their legs. Severe diarrhœa sets in, death resulting in a few hours. The better condition the clean birds are in the quicker the poison will act. The fowl ticks themselves are infested with a parasite which they pass into the blood of the fowl, where

it becomes a blood parasite, and the micro-organisms multiply with such marvellous rapidity that, in most cases, the fever causes the death of the birds. Every bird, in turn, becomes a centre of infection for healthy ticks that suck its blood, thus becoming in turn infected, and transmitting the blood parasites into a fresh victim. This disease is known as Spirochaetosis in fowls and is caused by a blood parasite. This tiny organism is conveyed from ticks to healthy fowls through the bite of the commonly known poultry tick (*Argus persicus*), its incubation period ranging from three to nine days.

The ticks are capable of transmitting the disease to healthy birds five months after feeding upon the blood of (*Sphiro-chaeta*) infested fowls.

All poultry, fowls, ducks, geese, and turkeys, are subject to the disease, but the losses are always greater amongst the first mentioned. This may be accounted for by the fact that the latter are more restless in their habits, therefore the "seed" ticks have not such opportunities of attaching themselves to these birds.

## REMEDY AND PREVENTION.

Once the ticks have firmly established themselves in the fowlhouse, it is almost impossible to eradicate them. Therefore the houses and fences should be burnt, likewise any trees that may have been in the pens, and the ground thoroughly disinfected with some strong solution. From experience the following have been found very effective remedies:—Pure kerosene, crude petroleum, creosote, or some of the standard dips, used at a strength of one part of the dip to three parts of water.

The new houses should be of iron, with as little woodwork as possible. The perches, which should be tick proof, can be procured at almost any ironmongery or poultry supply store. A good plan for a perch is to put two supports of sawn timber into the ground. Drive a nail into each at the top; bore a hole in each end of the perch so that the nail will just go through, and then lay the perch in the supports. This will keep it in position, and the perch can be lifted up to see if any ticks are underneath. Tie a piece of flannel round each support of the perch about half way up and, if there are any ticks about, you will in time catch them all, as after feeding on the fowls they will start for their hiding place but, being full and lazy, will take the first shelter offering, thus you will find them under the perches or under the flannel. The latter can be removed and be burned along with the ticks that hide in it, and be replaced with fresh clean flannel.

Every care should be exercised to ascertain that all birds coming into the yard are clean and free from diseases and pests. If there is the slightest doubt, the birds should be placed in strict quarantine for

nine days and the coops in which they have been kept thoroughly inspected. If young ticks are discovered clinging to the bodies of the fowls, the birds should be dipped in a strong solution of phenol or Cooper's sheep dip, which will kill the pests. After the birds have been dipped in the solution they should be given a teaspoonful of port wine every few hours, and kept in a dry, warm place.

If the fowlhouses are not badly infected the tick can be eradicated by thoroughly spraying with some of the solutions previously mentioned.

On account of its cheapness and the fact that it is so easily prepared, the following is recommended:—Boiling hot soapsuds, to which add ½ oz. crude carbolic to the bucketful. The action of this solution is sure, and if properly applied it will penetrate into the smallest cracks and crevices, which a thicker solution would not reach.

Hot coal tar is also a good thing to use on fences and buildings, but care must be taken that it gets into all the cracks.

If whitewash is used, care must be taken that it is not applied too thick, because as the wash dries a space is left between it and the wood, which makes a good harbour for the pests.

There is yet another method which I have found to be very effective and that is the use of a blow lamp (such as painters use). The heat and flame from this lamp will penetrate into the smallest cracks and kill all pests that may be concealed therein.

If the poultry keeper will follow out these simple instructions, his yard should soon become free from the pest, and if it does not remain so, he will only have himself to blame for lack of the precautionary measures suggested in regard to the introduction of fresh birds, coops, &c., or non-observance of those warnings contained therein.

## FRUIT CANNING WITHOUT SUGAR.

A correspondent of the "Farm Journal," Sydney, writes:—

I came across a very good way of canning small fruits without sugar, and as I have been very successful with it, I thought someone else might like to try. Warm your bottle well in the oven, then fill with fruit. Pour in boiling water till it is as full as it can be. Put back in oven and leave until the bottle begins to boil again. Take out and put on rubber ring and screw top, previously well warmed. Stand jar on its head until cold, give an extra "screw" if necessary—and the thing is done. I did plums and nectarines early in the season, and they look lovely and are keeping well. I intend to do gooseberries and other materials now.

# The Orchard.

## SCARING BIRDS FROM FRUIT TREES.

A correspondent of the "New South Wales Agricultural Gazette," says he effectively overcame the bird trouble by making an effigy representing a hawk and suspending it on an overhead wire. This completely scared the small birds away, but the crows made a concerted attack on it. He therefore studded it all over with long darning needles, points outwards. On examination he found several of these broken off, and after a while the crows ceased to attack. The experiment was most successful as he had very little pecked fruit that season.

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## THE ORIGIN OF THE NAVEL ORANGE.

In the last month's issue of the Journal we published an article taken from the " Agricultural News" of Barbados, on the above subject. It was therein stated that the average annual production of forty-year-old trees in Brazil is about 100 oranges per tree, and the average annual rainfall in Bahia is about 50 inches. Mr. C. Ross, Instructor in Fruit Culture, says that in Queensland the average crop of these trees is about 400 per tree under lesser rainfall conditions, and forty year-old trees should produce even more. This contention is amply borne out by the average annual returns from Queensland orange plantations.

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## A FINE BUNCH OF BANANAS.

Mr. Kaminksi, owner of the "Sunbeam Fruit Farm," the Mountain, Nikenbah, sends a photograph, here reproduced, of a fine bunch of bananas and some pineapples grown on his orchard without the aid of any fertilisers. The banana bunch contains 20½ dozen good marketable fruit and the pines weighed 10 lb. each. The soil must be of first-class quality to produce such fruit without the application of manure, and the knowledge that this can and has been done should give great encouragement to those of our gallant soldiers who on their return from the European battlefield may elect to settle down to the peaceful life of fruit-farming on many of the suitable lands now being surveyed and reserved for returned soldiers. Nikenbah is 21 miles from Maryborough.

Mr. Kaminski has since stated that the soil on which the fruit was grown is practically new ground, and the bananas were of the third cutting, the pines, part of the fourth crop. The soil is of a grey colour and fairly stony, and the bananas thrive best amongst the largest stones. In fact, almost any fruit planted does well in the district as the majority of the land is highly situated and close to the sea.

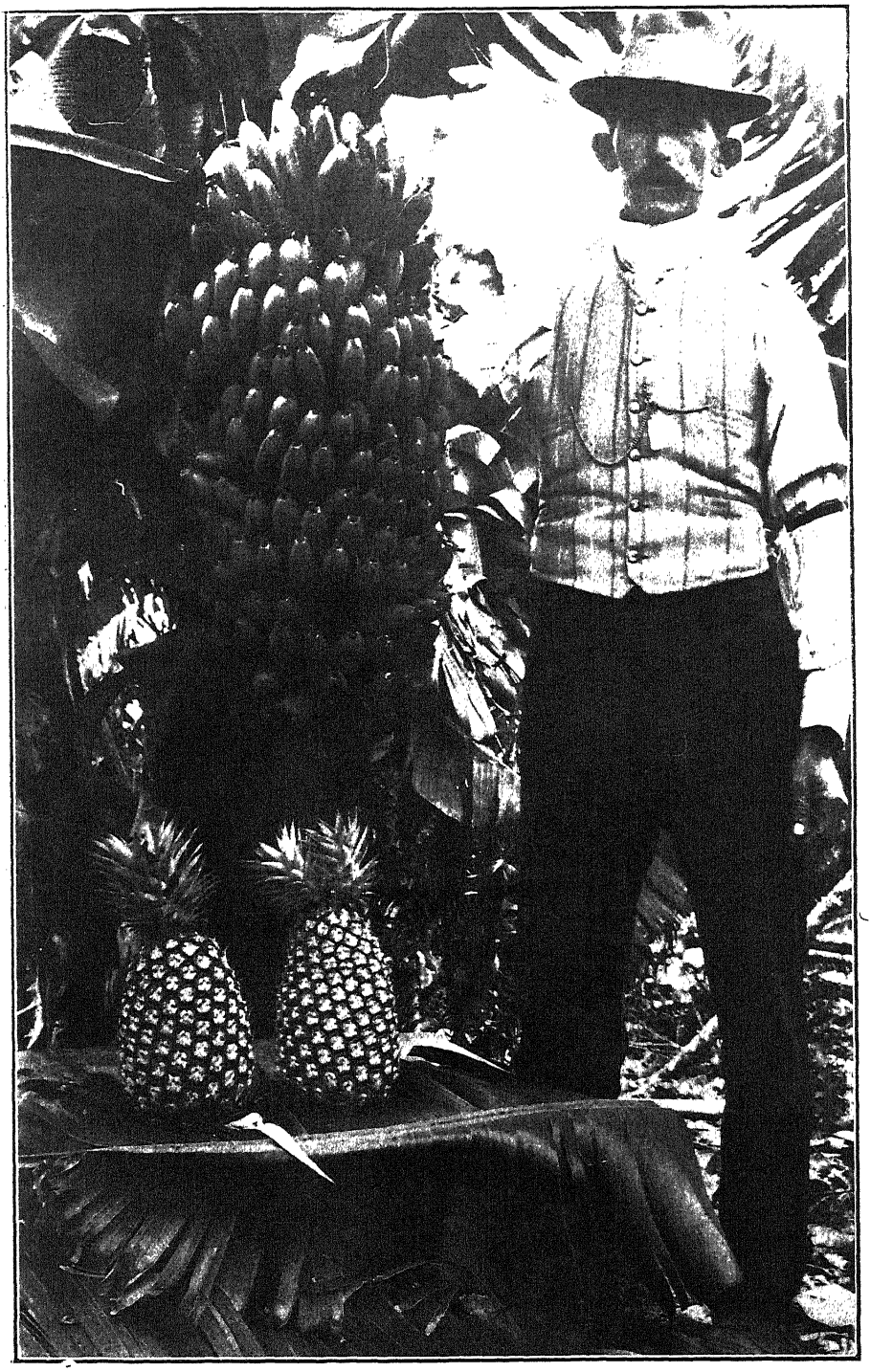


Plate 6.—Bananas and Pineapples from Mr. Kaminksi's Farm, Nikenbah.

## A GOOD NAVEL ORANGE.

We have received from Mr. John Williams, proprietor of Sunnybank Nursery, Sunnybank, a sample of a navel orange which was originally raised by Mr. Dunning, of the Blackall Range, from a seed obtained by Mrs. Dunning from a navel orange grown by her father, Mr. George Butt, of Montville. It is a remarkably fine example of that excellent variety of citrus fruits—the Navel, and is well worthy of a prominent place in the Orchard. "The Dunning," as the fruit has been named, is a large, clear-skinned fruit, seedless, with firm, juicy flesh of excellent flavour. Mr. Williams is a specialist in citrus propagation, and growers may depend on obtaining trees true to name from his nursery.

## THE BANANA AND ITS BY-PRODUCTS.

In addition to the sale of the fruit itself, there are numerous side lines which add considerably to the value of the returns per acre, which in themselves range from £40 an acre upwards; in fact, it is often stated in Natal that a return of over £100 per acre from a well cultivated plantation is not excessive. Amongst the side lines may be mentioned such things as banana figs (a delicious confection), banana flour, banana coffee, and banana fibre, while many people will be surprised to know that banana wine is reputed to be a very refreshing drink. A most excellent whisky is also made from the banana, and some samples of it exhibited at the St. Louis Exhibition, after analysis by the Department of Agriculture in Washington, were awarded the gold medal. It has this advantage over malt whisky, that it is ripe at the end of one year, whereas malt whisky requires to be kept in cask for several years.

There are many other side lines which might be taken up, and if worked on a scientific basis would result in the establishment of a very substantial industry. Drying bananas for the manufacture of flour and figs has been carried out in Jamaica and other countries for several years past. In many cases drying is done in the sun, but it has been found much more expedient to dry the banana artificially, for which purpose a very elaborate mechanical process is employed, the fruit being placed in a vacuum chamber capable of handling several hundredweight of bananas per day.

A very valuable manila hemp is produced from species of musa bananas, and in Java several thousands of acres are devoted to this plant, and the fibre is valued at anything from £25 per ton upwards. Some samples of fibre produced in East Africa, and reported on by the Imperial Institute, were stated to be readily saleable in the London market and probably worth about £50 per ton. [£62 to £67 in June, 1917.—Ed "Q.A.J."] It is not necessary, however, to cultivate the banana for fibre, as the wild variety seems to serve the purpose quite well.

In the West Indies, where banana growing has been brought to a high state of perfection, special vans are employed for transporting the products on the railway, and specially fitted steamers convey the fruit to the British market.—"Agriculture News," Durban, S.A.

# Tropical Industries.

## PROSPECTS OF PLANTATION RUBBER AS A FIELD FOR PERMANENT INVESTMENT.

In three successive issues of our Journal last year, viz., Nos. 3, 4, and 5 of the current volume, we discussed the Plantation Rubber Outlook solely as regards prices, production, stocks and consumption of the commodity. We note from papers recently to hand from London that great interest is revived in rubber shares which, for some time past, have not received the attention they deserved, and a valued correspondent's remarks, published in our last issue, emphasise this fact. Although in some quarters, rubber shares are still regarded as "dangerous speculative investments," the majority of investors regard the shares of well-selected companies as good as gilt-edged securities. We have frequently been told by pessimists that the rubber industry has not stood the test of time, and there is, no doubt, some truth in it. The past six years, 1911-16, witnessed the establishment of the industry on a sound basis, and the returns have been steady and regular, but to the overcautious the period of transition from its infancy in 1900 to sturdy manhood in 1916 is not this view, but there is another long enough. We do not share the view, but there is another factor which must also be taken into account before arriving at a decision as to the claims of writers that the rubber industry, for investment purposes, offers security with large profits such as it is difficult to match elsewhere. The factor we refer to is that of America as the largest consumer of the world's production of rubber. We are quite aware of the inter-dependence of the two countries, but it may perhaps some day occur to the United States to keep away from the plantation market on the score of price. This, however, can only be a temporary measure, but the effect on the share market will be more than temporary. We mention this merely to show how far ahead some people are inclined to look.

The present time therefore is, we think, quite opportune to give the views of a well-known member of the London Stock Exchange who has for years specialised in rubber shares, and we consider, therefore, is in a position to speak with true knowledge of the industry and the market. We are tempted to quote largely from this admirable brochure, which has been kindly placed at our disposal.

In considering the rubber planting industry as a field for investment, says the writer, it is desirable for purposes of comparison to establish some unit of measurement. What shall it be? The unit most generally adopted in rubber planting circles is the acre of rubber.

An acre of rubber in full bearing yields 400 lb. Well managed companies produce them at 1s. per lb. inclusive of all charges, so a

selling price of 2s. per lb. leaves a profit of 400 shillings or £20 per acre. If it be granted that the rubber planting industry should yield a return of 10 per cent. per annum to the investor, then (if we capitalise on that basis this income of £20 per acre per annum) an acre of mature rubber will fairly represent a capital value of £200, assuming a permanent selling price of 2s. If the price at which we purchase shares represents a purchase of mature rubber at less than £200 per acre, the return on our investment will be proportionately enhanced. Local conditions, of course, may vary. Choice estates will yield as much as 600 lb. at maturity, and poor ones only 200 lb., but assuming an average of 400 lb. an acre and 1s. per lb. profit on these figures £200 an acre represents rubber on a 10 per cent. basis.

Perhaps the easiest way to grasp the question of the unit is to ask the question—What does a share in a rubber planting company represent? Let us take a company of £100,000 in £1 shares owning 1,000 acres of mature rubber. Each acre of rubber obviously represents £100 of capital, so each £1 share represents a hundredth of an acre of rubber. A man holding one hundred shares may be regarded as the owner of an acre of rubber.

Now the price at which rubber estates have been planted out and brought to the mature stage varies in a remarkable degree. In times past instances can be found of experienced planters who have achieved this result at £20 per acre. To-day, on the other hand, if a group of ordinary investors were to come together to take up and plant out land they would probably find by the time their rubber was mature it would have cost them about £50 per acre.

The following table will show how great is the variation in capitalisation at par of different companies:—

| £1 Shares. | Capitalisation per Acre at Par. |
|---|---|
| Bukit Rajah .. .. .. .. | £17 |
| Kuala Lampur .. .. .. .. | 41 |
| Lanadron .. .. .. .. | 57 |
| Tali Ayer .. .. .. .. | 79 |
| Grand Central .. .. .. .. | 90 |
| Seaport .. .. .. .. .. | 105 |

| 2s. Shares. | Capitalisation per Acre at Par. |
|---|---|
| Cicely .. .. .. .. .. | £13 |
| Linggi .. .. .. .. .. | 14 |
| Vallambrosa .. .. .. .. | 15 |
| Bukit Mertajam .. .. .. .. | 69 |
| Kamuning .. .. .. .. | 83 |
| Sengat .. .. .. .. .. | 108 |

Other things being equal, it is obvious that the company with the lowest capitalisation per acre will give the highest return. It is equally obvious that there will be a tendency in the market for the shares of

the various companies to attain prices at which the return to the investor will be the same whatever share he buys. But a tendency must not be mistaken for an accomplished fact. With many investors sentiment is as powerful a factor as reason. Investors do not always choose the share which is the cheapest, but frequently that which looks the cheapest to their uninformed judgment.

Suppose, for example, three companies of equal merit each owning 1,000 acres matured rubber. Let A be capitalised at £20 an acre, B at £40, and C at £100. The profit of all three companies (on our previous figures of £20 an acre) will be identical, or £20,000 per annum, but the return will be 100 per cent. on A, 50 per cent. on B, and 20 per cent. on C. Logically, measured by the 1,000 acres of rubber each company possesses, and by the earning capacity of that rubber, the prices at which the £1 shares of A and B ought to stand,—if C stand at par,—are, A, £5; B, £2; but logical considerations only weigh with some investors, and only partially weigh with others, so it will be found in practice that the share which ought to stand at £5 will very likely stand at £4, and the share which ought to stand at £2 will not stand higher than £1 15s., and the reason is that the £1 share at £1 looks cheaper than the others at £2 and £5 respectively, although in reality it is not.

The writer proceeds to discuss the question of profit thus:—

If the profits on rubber planting be permanent, rubber investments should, we have indicated, go to a 10 per cent. basis. This brings us to the question—Will the present rate of profits be maintained? Must not the return on rubber fall to an ordinary commercial profit?

This question cannot be answered by a simple "Yes" or "No." In theory the answer will be "Yes, ultimately." In practice it will be found that the rubber producing industry is a peculiar one, embracing factors that tend to postpone indefinitely the "ultimately", that they be at once conceded for the sake of argument. Theoretically, if rubber planting continue to yield a profit of 100 per cent., if rubber be produced at 1s. per lb. and sold at 2s., there will be such a rush of capital into the rubber-planting industry that the result must be a vast increase in production, and a fall in price, with a consequent reduction in profits to an ordinary commercial level. Now capital can be invested in the rubber planting industry either by the purchase of land and starting of new plantations, or by the purchase of shares in existing plantations. It costs to-day (as we have stated) £50 an acre to bring a rubber estate to the producing stage, and for five years the capitalist has to forego all return on his capital. If he can acquire an acre of five-year-old rubber for £100 by a purchase of rubber shares, and obtain at once a return of 10 per cent., rising by the end of five years to 20 per cent., per annum, it is obviously a far superior investment to buy shares of existing companies than to go in for a new plantation. Therefore, unless and until rubber shares rise to a level of, say £150 to £200 an acre, no vast rush of capital into the rubber-planting industry has to be contemplated.

The yield per acre is carefully discussed, and the writer quotes the figures given by Mr. Henry T. Brice in his interesting work in 1911 and repeated in 1914, showing the fair average yields in pounds per acre for rubber at various stages. Working on these figures the average of 211 lb. an acre all over is arrived at as regards the area planted from 1905 to 1911. Judged by the results of the year 1915 the figures of Mr. Brice are borne out remarkably. A similar calculation for the year 1920 is made out and an average of 385 lb. an acre all over is shown. The presumption is, since the figures in the first table are not continued beyond 10 years, that the increase in yield would be 50 lb. per acre every year up to 1920.

The other points touched on and ably discussed are the World's Production and the Growth of Demand. Regarding the latter, the following remarks are made as to America's needs:—

For the past five years the annual consumption of rubber has been allocated roughly one half to the United States and one half to the rest of the world. In 1911, the United States took over 46 per cent. By 1915 the proportion had grown to 61 per cent. It is, then, upon consumption in the United States that the future of the rubber industry chiefly hangs. The following table shows how consumption is growing:—

| | Increases in World's Production in Tons. | Increases in United States Consumption. |
|---|---|---|
| 1911 .. .. .. .. | 4,000 .. | 2,000 |
| 1912 .. .. .. .. | 24,000 .. | 15,000 |
| 1913 .. .. .. .. | 9,000 .. | Nil |
| 1914 .. .. .. .. | 12,000 .. | 10,000 |
| 1915 .. .. .. .. | 39,000 .. | 35,500 |

The development of motor traction is largely responsible for this. His motor-car hitches the backwoods farmer on to civilisation. The dweller in remote districts soon discovers that his automobile is not a luxury but the best-paying investment he ever made, and it is the thing he cannot afford to give up when hard times compel all-round economy.

If demand in the United States continues to maintain its recent rate of growth (and there seems no valid reason why this should not be the case), then it must assuredly before long overtake the prospective supply.

The following summing up is worthy of repetition.

One closing remark by way of afterword. In uninformed circles it is argued that rubber investment cannot be sound because the return is so high. Now that "highest interest means low security" is a sound maxim, but it applies to borrowers. Planting companies are not borrowers in the sense of the proverb, but are associations of shareholders planting their own land with their own capital. Their investment is with Mother Nature, who rewards her children with no niggardly hand. Moreover, the rubber planting industry is reaping the just reward of virtue in respect of the sound financial basis upon

which the great bulk of the companies were formed. Promoters' profits were small, there is little or no watered capital to pay a return on, so it is natural, right, and just that shareholders should get a large return on their investments on rubber. The rubber market is as safe a one for investment to-day as any other industrial market in the Stock Exchange, and safer than most. It has no troubles to contend with from organised labour; climatic conditions affect it to but a trifling extent. Months of flood or drought involve simply a slight curtailment of crop. Demand for the staple article produced is persistent both in Peace and War, for it is a necessity of both. Synthetic bubble after synthetic bubble has been exploded until the present low cost of production of rubber itself is safeguard against even a genuine synthetic product, were one forthcoming. On all of these grounds, then, the rubber share market is bound to be recognised in the future as a great field for investment, and that of the soundest and most solid description. Either other industrial securities will have to fall in price till they yield as big a return as rubber, or rubber securities must rise till they yield as small a return as other industrial securities. There is no escape from this dilemma. Rubber shares will not continue permanently on a 10 to 15 per cent. basis.—The "Fiji Planters' Journal," May, 1917.

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## THE PRODUCTION OF GOOD SUGAR-BEET SEED.

From the "Louisiana Planter," 3rd February, 1917.

From an excellent article on the beet sugar industry, by Dr. F. S. Harris, Director of the Utah Agricultural Experiment Station, we take the following notes on the method of raising good beet seed:—

"With most kinds of crops seed can be taken from the ordinary commercial product; hence the getting of seed is a very simple matter. With sugar beets, on the other hand, good seed is obtainable only by a great amount of work carried on in a systematic manner.

### "DIFFICULTIES OF SEED PRODUCTION.

"The commercial production of sugar beet seed is beset with many difficulties. Probably the greatest of these is the maintaining of a strain of beets with high sugar content and yield. The fact that the sugar beet has, in recent times, been bred up from a plant with comparatively low sugar content to its present high standard makes it somewhat unstable, and unless selection is continued deterioration occurs very rapidly.

"This continuous selection requires men who are familiar with the principles of breeding as well as men who have skill in making chemical analysis of the mother beets. Those who raise the mother beets and produce the seed must also be acquainted with the method of handling the crop. All of these special requirements delay the introduction of the beet seed industry into a new region. The time necessary to elapse from when selection is begun until the first seed is ready for market is so

great that investors hesitate to put their money into the business. Those who want quick returns are not willing to spend the time necessary to build up a business based on the sale of products of merit.

"The production of sugar beet seed therefore is not a business for the individual farmer with limited resources, but can best be done by a company with resources to build up a good substantial business wherein the profits will depend on the establishment of a reputation.

## "GENERAL METHODS.

"The approved method of producing seed requires a number of years of selecting and testing in order to get a strain possessing the desired qualities. Seed is saved from tested beets of selected strains. This is called 'mother seed.' This mother seed is then planted, and the beets which are obtained used as mother beets to produce the commercial seed two years later. Roots only are produced the first year after seed is planted. These must be dug and stored over winter, and the second year they are set out and produce seed.

"The difficult part of the operation is the securing of suitable 'mother seed.' After this is obtained the individual farmer can raise the commercial seed.

## "GETTING THE MOTHER SEED.

"The mother seed used in raising the mothers which produce the commercial seed is obtained only at considerable expense and after a number of years of work.

"The procedure usually carried out is about as follows:—The first year a great many beets of desirable size and shape are analysed for sugar. The better individuals are siloed, and the second year are planted and produce seed. The third year the seed from each beet is planted separately, and the resulting beets analysed. From this analysis it is possible to tell which of the original beets with a high sugar content are able to transmit to their progeny this necessary quality. The poor strains are discarded and the good ones siloed, to be used the fourth year in producing the mother seed. The mother seed is planted the fifth year, and the beets obtained from it produce the commercial seed the sixth year from the time the work was begun.

"It is not safe to use all individual beets that have a high sugar content without making a test to see if that quality is transmitted, since the high sugar content may be due to the conditions under which the beet grew and not to its intrinsic high quality. It is not the mother beet with high sugar content that is desired, but the mother whose

progeny will be high in sugar. In testing strains it is a good thing to have standard seed for comparison growing in different parts of the test field.

"In getting beets from which the commercial seed is produced, the roots are left considerably thicker in the rows than where regular beets are to be raised. About eight pounds of seed are used to the acre, and the plants are not thinned. This method is used in order to save land, and also to save labour in handling the beets. Less storage space is required for the small beets than for those of full size. Being small does not seem to reduce the amount of seed produced. These small beets are called ' stechlinge ' or ' fingerlings.'

"SILOING.

"One of the most important operations in connection with seed production is the storing over winter, or siloing, of the beets that are to be used the next year in raising seed. At the Utah Station quite a number of methods of siloing beets have been tested, and a number of these have given good satisfaction. The important things to be kept in mind are that the beets must not be allowed to dry out or to heat. There must be sufficient ventilation to allow the carbon dioxide produced by normal respiration to escape and at the same time not enough to dry the beets. The beets must have sufficient covering to prevent freezing, but not enough to cause heating.

"Beets stored in dry sand kept the best of any method which was tried, although this method is perhaps not practical except for the comparatively few mother beets that have been individually analysed and are more likely to decay on account of the wound caused when the core is removed for analysis.

"For the large number of beets used in producing the commercial seed, perhaps the best way is to silo them right in the field. This is done by piling the beets on top of the ground or in a shallow trench in ricks 5 or 6 feet wide, and then covering them with straw and soil or with soil alone. Only a light covering is given at first and more added as the weather gets colder.

"Ventilators should be placed in the ricks every few feet to allow carbon dioxide to escape and fresh air to enter. If a long rick is made, the beets should be divided every 12 or 15 feet by straw or earth, so that if decay begins at any point it will not destroy all the beets in the silo. Before planting the beets in the silo it is a good thing to remove the tops, leaving enough of the crown and tops so that growth will begin the next spring. If mother beets are allowed to wilt before they are planted, the yield of seed is greatly reduced.

"PLANTING.

"The mother beets can be planted considerably earlier in the spring than the beet seed, since the old beets are not so sensitive to frost as the young plants starting from the seed. It is probably needless to say that the land should have been ploughed deeply. Experiments with a number of methods of planting and distances between plants have been made and the following method adopted as a result:—

"The land is marked each way about 30 inches apart and a beet dropped at each crossing of the marks. The best distance apart will, of course, depend on conditions. A long spade is pushed into the ground and the beet put in behind the spade as it is moved forward. It is important to get the beets well below the surface of the soil. The crown should be covered with a small quantity of soil to protect the budding top. The rows being the same distance apart each way, the cultivator can be run in two directions and much hand labour saved.

"CARING FOR THE SEED CROP.

"Cultivation should be begun early in order to conserve moisture and prevent the weeds from starting. If proper cultivation is given at first, but little will be necessary later.

"The seed crop does not require many irrigations, but it is very important to have the soil moist during the time seed is forming. But little work is necessary between planting and harvesting aside from cultivation and one or two irrigations.

"HARVESTING AND THRESHING.

"Since the seed does not ripen evenly, it is necessary to go over the field and cut some of the plants before all are ripe. The ripening period may extend over a number of weeks. The cutting is done with a sickle, and the seed stocks piled in the field to dry before threshing. It usually pays to go over the field after harvest with a brush and dusting pan to glean seed that has fallen to the ground in cutting. Threshing can be done with a regular grain threshing machine, and from 15 to 20 tons of seed can be threshed in a day.

"CLEANING.

"After the seed is threshed there is always a certain amount of dirt and stems remaining. These are best removed by running the seed over a revolving canvas, which allows the seed to roll off, and at the same time carries the stems away. The dirt and chaff are removed with a fanning mill before the seed is run over the canvas."

# Entomology.

## EXPERIMENTS IN POISONING CANE-GRUBS.

The following report has been received by the General Superintendent of Sugar Experiment Stations from the Assistant Entomologist to the Bureau (Mr. E. Jarvis) :—

Referring briefly to field experimentation with poison bait for cane-grubs, carried out lately at Innisfail and Meringa along the lines advocated in Bulletin No. 4 of this office, I may state that in the former locality a couple of acres were treated by Mr. F. L. Sugden, of "Johnstone River," but owing to the scarcity of grubs no damage to his crop was perceptible, either on this area or on immediately adjoining untreated cane land; so that the result of the experiment is left in doubt.

"One important point, however," writes Mr. Sugden, "appears to be definitely proved, that the application of even a heavier dose of Paris Green than you advised has had no injurious effect, but rather the reverse, on the growth of the crop."

The foliage of cane treated at Innisfail was noticed to be more luxuriant and of a darker green than that on the adjoining untreated area.

The above conclusion arrived at by Mr. Sugden verifies the author's opinion with respect to treated cane grown in pots at the laboratory last October. (Australian Sugar Journal, Vol. VIII., p. 741.)

Our half-acre plot at Mr. A. J. Draper's "Carrah" estate was treated with bait consisting of cowpea foliage dusted with copper arsenate.

The peas, which were sown on 25th January in trenches among cane planted last August, were duly poisoned and covered over on 14th February, the arsenical being applied at the rate of 24 lb. per acre.

Early in March the plantation on each side of this test plot—with the exception of a strip nine chains long containing a quarter of an acre adjoining its southern boundary, and about three acres on the northern edge of the 30-acre block—were treated by Mr. Draper with bisulphide of carbon.

At present the cane on our experiment plot is fully 8 feet high, and quite as flourishing as that growing on soil that was fumigated.

The untreated quarter acre appears to be suffering slightly, but owing to the foliage being over six feet in height, one can examine only the end of this strip, which is about 20 feet wide.

To form a correct opinion as to its condition it would be necessary to look down on it from above and compare the height and colour of the leaves with that of the cane on either side.

The three untreated acres on northern boundary, however, are already affected in places.

Presuming that grubs occurred early in the season over the entire area of this 30-acre block, we may, I think, reasonably conclude that arsenical poison-bait will destroy them just as effectively as fumigation with carbon-bisulphide.

The weather during the entire course of this experiment has been more or less showery, thus allowing affected plants to root afresh, and keep fairly green. In the event of normal dry conditions setting in we may expect to see more definite indications of grub attack on these plots at Meringa.

It will be interesting later on, when harvesting the cane, to determine the weight of yields per acre on treated and untreated areas.

## THE QUEENSLAND GIANT RAT.

MOUSE.—

Yes. Mr. H. A. Longman (Queensland Museum), in his "Notes on the Classification of common Rodents," from which the illustrations of rats and mice in the June issue of this Journal were taken, mentions "The Giant Queensland Rat" (*Uromys macropus*), which is found in North-eastern Australia. There are seven specimens of this rat in the Queensland Museum from the Cardwell district. *Uromys banfieldi*, De Vis, from Dunk Island, north-east of Cardwell, is remarkable for the length of its teats. The *Uromys macropus* (big foot) measures over 12 inches over head and body, and the tail is about the same length. Its limbs are robust; the hind feet large, giving rise to the specific name *macropus* (big foot); the nails are large and broad at the base. The general colour above is greyish-brown tinged with reddish, with coarse black-tipped hairs intermixed; white below; whiskers very long, stiff and black; feet white; tail black on the basal, and white or pale-yellow on the apical half. It is said to be not uncommon in hollow trees in the plains, but Krefft stated that the animal frequented rocks more than trees, so that its habitat seems to be variable. Our illustration is taken by permission from Mr. Longland's work above mentioned.

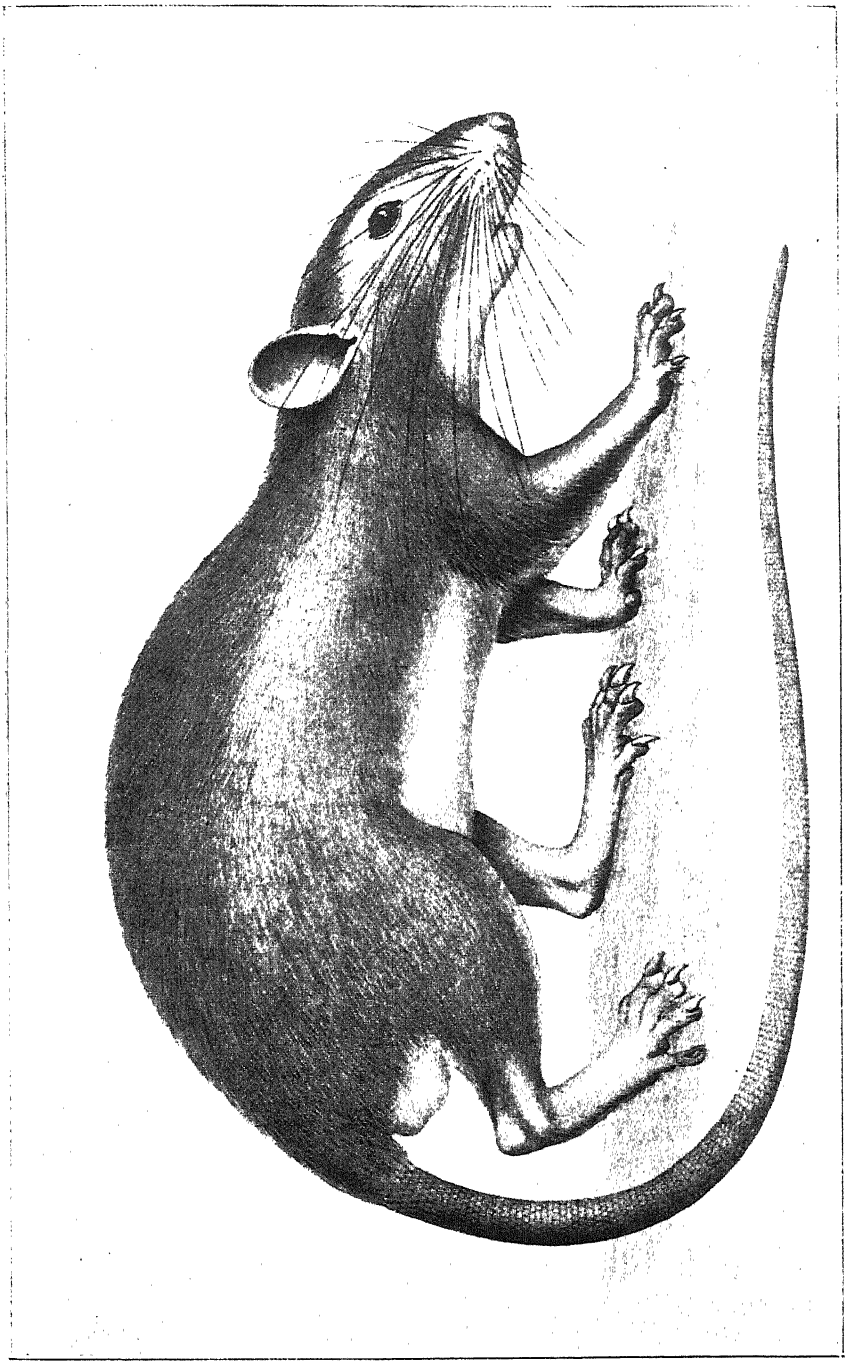


PLATE 7.—THE QUEENSLAND GIANT RAT.

# Botany.

## ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, Acting Government Botanist.

No. 10.

SIDA CORDIFOLIA, *Linn.*

*Description.*—A rather coarse branching undershrub, more or less clothed with a soft stellate tomentum of velvety hairs. Leaves rather long-stalked broadly cordate (heart-shaped) or almost orbicular, or rarely ovate, mostly 1-1½ in. diameter, rarely more, usually soft and thick. Flowers yellow on short axillary pedicels (flower-stalks) or clustered into short leafy racemes. Calyx softly tomentose, carpels about 10 together or sometimes fewer, opening at the top in two valves and terminating in rather long awns.

*Distribution.*—A native of tropical Australia, and a common weed widely spread throughout the tropics of the whole world. It is a great pest around some of the towns and townships of Northern Queensland, and during the past couple of years has appeared in the neighbourhood of Brisbane and some other Southern localities.

*Common Name.*—Though an abundant weed, I know of no vernacular applied to it; the botanical one—*Sida cordifolia*—is short, euphonious, and distinctive.

*Uses.*—It is generally left untouched by stock; though quite wholesome the hairy nature of its leaves and the fibrous nature of the stems make it of very slight value as a fodder. Like other species of the genus it is held among the Hindus and other Asiatics to possess considerable medicinal virtues, the only one of any value probably being the use of its mucilage mixed with rice in cases of dysentery.

*Eradication.*—In small areas hand pulling is the most effective method; in larger areas cutting off below the surface of the soil or where the land is not wanted for some little time and the plants are growing thickly together spraying with any of the commercial weed-killing preparations should prove successful. The plants should be dealt with, of course, prior to seeding.

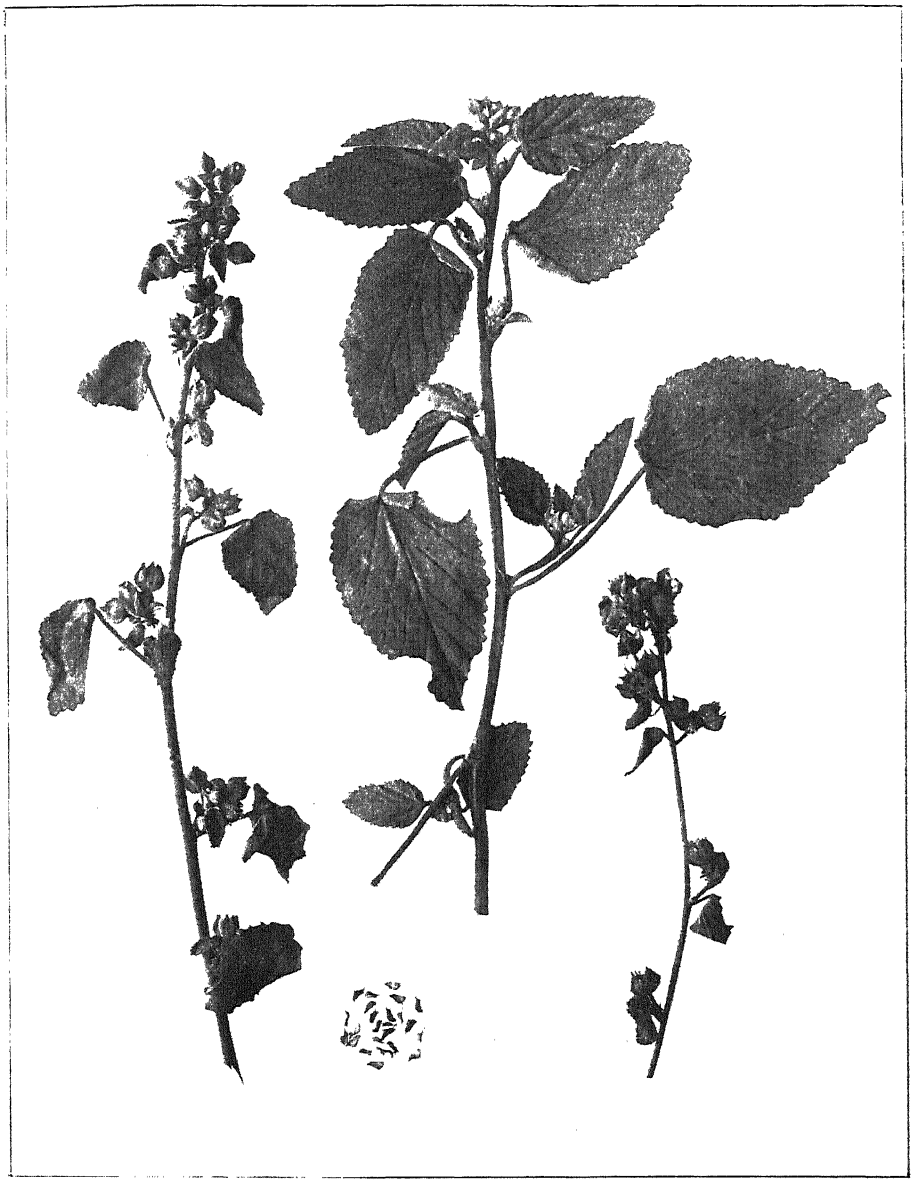


PLATE 8.—SIDA CORDIFOLIA, *Linn.*

# General Notes.

## PLANTATION LIFE IN MEXICO.

Perhaps a perusal of the following account of the difficulties of sugar planters in Mexico, republished from the "Louisiana Planter," in the "Queensland Sugar Journal," will give us pause, when we grumble over conditions in the agriculture world of Queensland, and tend to make us thankful that we, in spite of sundry labour difficulties, which periodically crop up, still live in a free country, and where no brigands can perform here as do the Mexican bandits.

It appears that having to their own satisfaction established the fact that Mexico is a country with soil and climate admirably adapted to the growth of sugar cane, some Americans formed a company with a capital of something over a million sterling, and up-to-date machinery was installed. An area of some 3,376 acres was planted, and the annual crop is said to have been at the rate of about 5 tons of sugar per acre. The outlook was most promising, until the revolution in 1911-12. Since then, as a contemporary remarks, "the plantation has not come to its own." In 1915, for example, the work was interrupted by bandits, and when the rainy season set in, 500 acres of the crop remained uncut. For three or four years, the bandits have done as they pleased. Labour was hard to obtain, because so many of the Mexicans delight in the life of adventure that hunts spoils, fights, and loves ease. These bandits came to the manager of the company, and demanded and obtained tribute of 2,000 dollars. Somewhat later another two thousand was taken, and this was followed by a third demand for the same sum, all of which was paid. Then they took possession of the plantation houses, robbing the company of merchandise, blankets, bedding and clothes. The place seemed to suit them in every way, and they made their headquarters at the mill for several weeks, so that all the operations of the factory ceased. Nearly ten thousand dollars were stolen in this way. Then, in August, 1915, Mr. Edward Wells, an American, who had been engaged as auditor, was brutally murdered and robbed of over eleven thousand dollars belonging to the company, which he was bringing to the head office. As all the employees of the company had been disarmed, there was no resistance. The company appealed to the State Department at Washington, with the result that might have been expected in view of all that has happened in Mexico. The bandits certainly were in no way perturbed as to the risk of punishment, for somewhat later they held up the boats engaged in bringing oil to the factory, with other raw material, and serious delay was the result. Still the company pushed ahead, and after surmounting tremendous difficulties they started crushing with about half their usual force.

No sooner had the factory started than the Government labour inspector arrived. These inspectors are employed by the military governor, and their word is law. They can even employ the military to enforce their demands. Their only compensation is derived from a portion of the fines they inflict. The inspector persuaded the labourers to leave the service of the company, though their wages at the time were double what the Government was paying. He preached anarchy, and caused old and previously faithful employees to leave. Work was suspended; everything that was moveable was taken away, and from 5,000 to 10,000 acres of cane were fired. As soon as the inspector had left, the manager and his workers were cited to appear before the local authorities on a charge of violating the labour laws, and five fines of £40 each were inflicted. The company was subjected to further impositions and injustices, and the labourers were so outraged that only the most faithful of them remained.

In spite of all this, crushing was carried on, and according to their annual report, the company had 13,200 bags of raw and centrifugal sugar ready for export. But the bandits now control the river bank, and threaten to sink any ship and shoot the crew, so no one ventures out. With the invasion of the American troops, the situation was only aggravated.

The company had even a cattle embargo to make things worse; for though they had 500 head at one of their stations, the governor, in view of military depredations committed every week, refused to allow the cattle to be shipped.

Industrially the country is paralysed; but it is hoped, we are told, that soon there will be a restoration of peace and prosperity.

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## WHEN THE CLOCK STOPS.

A clock will often stop without any apparent cause. In such a case it is probable that the works are choked up with dust. The remedy is to place in it a small piece of cotton waste soaked in kerosine, and leave it there for several hours. The fumes of the kerosine will loosen the dirt, and if dirt is the cause of the stoppage, the clock will go on as well as ever.

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## WATERMELON KOMFYT.

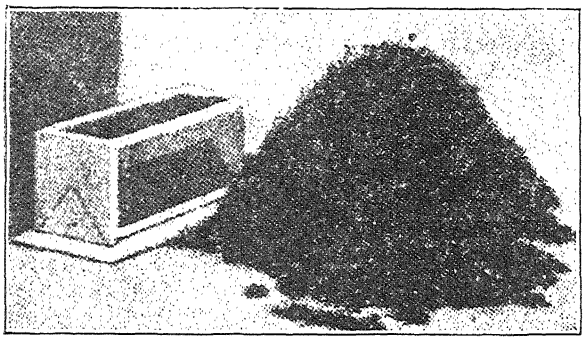
Take the skins (thick) of one small watermelon, peel the green part off and prick with a fork. Then lay in clean water (to which a dessertspoonful of lime has been added) over night. Next morning wash off and boil up in clean water, then drain and add ¾ lb. of sugar to 1 lb. skins, and cover with clean cold water. Boil till clear and tender. A few pieces of bruised ginger added will improve the flavour. This is a delicious preserve.

## A GOOD FLY-TRAP.

In a month or two—just so soon as spring puts in an appearance—the stable fly will be with us again. The fly is man's filthiest enemy and is responsible for more disease than we know. The gastric troubles from which youngsters suffer—probably, infantile paralysis—are due to the fly.

Wouldn't you like to do without the fly?

Mr. J. R. McKee says you can. He has invented a trap which, he says, works like a charm. He holds no patents because he wants every home to get rid of flies. He put some of these traps near the kitchen and the stables and caught a million. Here they are in the picture:

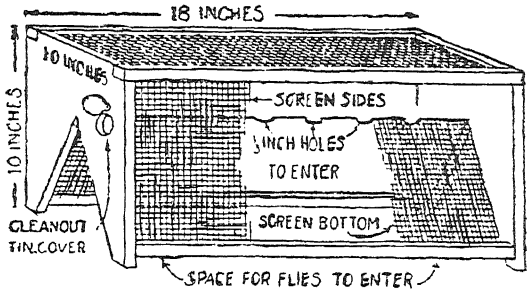


You don't want to count them; in fact, you wouldn't touch the heap of death-dealing, germ-laden filth if you could. The "million" is not a guess but a careful estimate, based on the counting of the dead flies in several small batches, and weighing each batch on accurate scales; then the batches were put together until they were approximately the million shown in the photographic evidence. A batch averaged 6,000 dead flies to the ounce, and each fly was provided with six legs, making a total of 36,000 feet to the ounce, every one a spongy receptacle for receiving and transferring millions of germs!

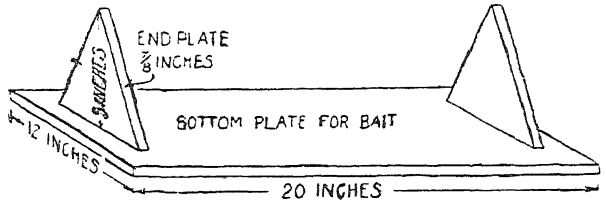
These flies were caught in the early part of the summer in the traps placed about the grounds, particularly between the house and the stables, but none of them were in the house or on the verandas. The usual fly delicacies were used for bait and included sugar, molasses, and fish bones. The open-air dining spaces were not the only places benefited, but the kitchens, pantries, and even the stables themselves.

The trap may be made any size, as the principle is the same and based on the fact that a fly will always crawl or fly upwards in its efforts to escape from an enclosure. As is shown in the detail drawing, the fly crawls under the wire-netting on to the baseboard, painted white

as an added lure, where the bait is placed. The fly find itself under an inverted V-shaped piece of screening, with half a dozen small holes along the top. It crawls up to the sides of the trap or flies to the top till it finds one of the holes, through which it goes into the trap proper.




This is the Fly Trap Which Was Found So Effective




which is simply a rectangle placed over the V and above the bait, and there his doom is sealed, for, though ingress is easy, egress is impossible.

The women of the country are the ones to carry on this work, and through them the children's aid should be enlisted.

Let us get into this fly-killing business. Queenslanders!—Farm Bulletin.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JULY, 1917.

| Article. | | JULY. |
|---|---|---|
| | | Prices. |
| Bacon | lb. | 9d. to 1s. |
| Barley | bush. | 2s. to 2s. 6d. |
| Bran | ton | £5 15s. |
| Broom Millet | „ | £32 |
| Butter | cwt. | 158s. 8d. |
| Chaff, Mixed | ton | £3 |
| Chaff, Oaten | „ | £6 to £6 10s. |
| Chaff, Lucerne | „ | £6 to £7 |
| Chaff, Wheaten | „ | £4 to £5 10s. |
| Cheese | lb. | 9d. |
| Flour | ton | £12 |
| Hams | lb. | 1s. 3d. to 1s. 4d. |
| Hay, Oaten | ton | ... |
| Hay, Lucerne | „ | £4 15s. |
| Honey | lb. | 4d. to 4½d. |
| Maize | bush. | 2s. 7d. to 2s. 8d. |
| Oats | „ | 1s. 6d. to 2s. 6d. |
| Onions | ton | £7 to £8 |
| Peanuts | lb. | 3d. |
| Pollard | ton | £7 2s. 6d. |
| Potatoes | „ | £5 10s. to £6 10s. |
| Potatoes (Sweet) | cwt. | 3s. |
| Pumpkins (Cattle) | ton | £1 to £2 |
| Eggs | doz. | 1s. 7d. to 1s. 9d. |
| Fowls | per pair | 3s. to 6s. |
| Ducks, English | „ | 3s. 6d. to 4s. |
| Ducks, Muscovy | „ | 4s. 6d. to 8s. |
| Geese | „ | 6s. to 7s. |
| Turkeys (Hens) | „ | 9s 9d. |
| Turkeys (Gobblers) | „ | 12s. 6d. |
| Wheat | bush. | 3s. 7d. |

## VEGETABLES—TURBOT STREET MARKETS.

| | |
|---|---|
| Cabbages, per dozen | 3s. to 6s. |
| Cauliflowers, per dozen | 6s. to 10s. |
| Celery, per bundle | ... |
| Beans, per sugar bag | 7s. to 12s. |
| Peas, per sugar bag | 7s. to 13s. |
| Carrots, per dozen bunches | 10d. to 1s. |
| Chocos, per quarter-case | 2s. to 2s. 6d. |
| Beetroot, per dozen bunches | 8d. to 9d. |
| Lettuce, per dozen | 1s. to 2s. |
| Marrows, per sack | 5s. to 5s. 6d. |
| Parsnips, per bundle | 7d. to 10d. |
| Sweet Potatoes, per sugar bag | 1s. 6d. |
| Table Pumpkins, per dozen | 1s. 6d. to 2s. 4d. |
| Tomatoes, per quarter-case | 2s. to 5s. |
| Rhubarb, per dozen bundles | ... |

## SOUTHERN FRUIT MARKETS.

| Article. | JULY. Prices. |
|---|---|
| Bananas (Queensland), per case | 8s. to 10s. |
| Bananas (Tweed River), per case | 8s. to 13s. |
| Bananas (Fiji), per case | 4s. 6d. to 6s. |
| Bananas (G.M.), per bunch | 5s. 6d. to 7s. |
| Bananas (G.M.), per case | 16s. 6d. to 18s. 6d. |
| Custard Apples, per twelve to fifteen tray | ... |
| Guavas, per case | 2s. to 4s. |
| Lemons (Local), per bushel-case | 2s. 6d. to 3s. |
| Mandarins, per case | 2s. to 6s. |
| Oranges (Navel), per case | 8s. to 12s. |
| Oranges (other), per case | 2s. to 5s. 6d. |
| Papaw Apples, per half-bushel-case | 1s. 6d. to 2s. |
| Passion Fruit, per half-case | 4s. |
| Persimmons, per half-case | ... |
| Pineapples (Queens), per double-case | 6s. to 10s. |
| Pineapples (Ripleys), per double-case | 6s. to 7s. |
| Pineapples (Common) per double-case | 6s. to 7s. |
| Tomatoes (Queensland), per half-bushel-case | ... |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | JULY. Prices. |
|---|---|
| Apples, Eating, per bushel case | 12s. 6d. to 14s. |
| Apples, Cooking, per bushel case | 12s. to 14s. |
| Bananas (Cavendish), per dozen | 1½d. to 4d. |
| Bananas (Sugar), per dozen | 2d. to 4½d. |
| Citrons, per hundredweight | 10s. |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per quarter-case | 3s. to 3s. 6d. |
| Custard Apples, per quarter-case | 5s. to 7s. |
| Granadillas, per quarter-case | ... |
| Grapes, per lb. | ... |
| Lemons (Lisbon), per quarter-case | 3s. to 6s. |
| Limes, per quarter-case | ... |
| Mandarins, per quarter-case | 3s. to 8s, |
| Oranges (Navel), per case | 9s. to 10s. |
| Oranges (Seville), per hundredweight | 11s. |
| Oranges (other), per hundredweight | 2s. to 4s. 6d. |
| Papaw Apples, per quarter-case | 1s. 3d. to 2s. |
| Passion Fruit, per quarter-case | 4s. 6d. to 5s. |
| Pears, per quarter-case | 8s. to 10s. |
| Peanuts, per lb. | 3d. |
| Persimmons, per quarter-case | ... |
| Pineapples (Ripleys), per dozen | 6d. to 2s. 6d. |
| Pineapples (Rough), per dozen | 6d. to 2s. 6d. |
| Pineapples (Smooth), per dozen | 1s. to 2s. 6d. |
| Pomeloes, per hundredweight | ... |
| Quinces, per quarter-case | ... |
| Rosellas, per sugar bag | ... |
| Strawberries, per dozen boxes | 5s. to 9s. |
| Tomatoes, per quarter-case | 2s. to 5s. 3d. |

## TOP PRICES, ENOGGERA YARDS, JUNE, 1917.

| Animal. | JUNE. Prices. |
|---|---|
| Bullocks | £19 12s. 6d. to £26 |
| Cows | £11 5s. to £15 2s. 6d. |
| Cows (Single) | £18 2s. 6d. |
| Merino Wethers | 43s. |
| Crossbred Wethers | 45s. |
| Merino Ewes | 31s. 6d. |
| Crossbred Ewes | 44s. 6d. |
| Lambs | 38s. |
| Pigs (Porkers) | 55s. |

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JUNE, 1917, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JUNE, 1917 AND 1916, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. June. | Average Rainfall. No. of Years' Records. | Total Rainfall. June, 1917. | Total Rainfall. June, 1916. |
|---|---|---|---|---|
| *North Coast.* | In. | | In. | In. |
| Atherton | 1·85 | 15 | 0·51 | 0·51 |
| Cairns | 2·92 | 34 | 0·38 | 2·21 |
| Cardwell | 2·13 | 44 | 0·36 | 1·00 |
| Cooktown | 2·10 | 40 | 0·30 | 1·47 |
| Herberton | 1·04 | 29 | 0·30 | 0·30 |
| Ingham | 2·53 | 24 | 0·48 | 1·88 |
| Innisfail | 7·27 | 35 | 4·23 | 3·39 |
| Mossman | 1·11 | 1 | 0·79 | 1·45 |
| Townsville | 1·39 | 45 | 0·07 | 0·26 |
| *Central Coast.* | | | | |
| Ayr | 1·44 | 29 | 0·42 | 0·11 |
| Bowen | 1·69 | 45 | 0·61 | 0·33 |
| Charters Towers | 1·52 | 34 | 0·04 | 0·16 |
| Mackay | 2·80 | 45 | 0·54 | 1·81 |
| Proserpine | 4·31 | 13 | 1·16 | 1·56 |
| St. Lawrence | 2·60 | 45 | 0·40 | 0·92 |
| *South Coast.* | | | | |
| Biggenden | 1·99 | 17 | 0·07 | 2·54 |
| Bundaberg | 2·89 | 33 | 0·04 | 3·33 |
| Brisbane | 2·63 | 66 | 0·21 | 2·79 |
| Childers | 2·36 | 21 | Nil | 2·73 |
| Crohamhurst | 4·13 | 25 | 0·58 | 3·06 |
| Esk | 2·05 | 29 | 0·27 | 2·36 |
| Gayndah | 1·87 | 45 | 0·05 | 2·21 |
| Gympie | 2·58 | 46 | 0·56 | 1·86 |
| Glasshouse M'tains | 4·52 | 8 | 0·70 | 2·88 |
| Kilkivan | 2·03 | 37 | Nil | 1·96 |
| Maryborough | 2·93 | 45 | 0·27 | 3·14 |
| *South Coast*—continued: | | | | |
| Nambour | 3·59 | 20 | 0·27 | 2·57 |
| Nanango | 2·00 | 34 | 0·09 | 2·37 |
| Rockhampton | 2·12 | 29 | 0·16 | 1·80 |
| Woodford | 2·71 | 29 | 0·48 | 2·24 |
| *Darling Downs.* | | | | |
| Dalby | 1·65 | 46 | 0·62 | 2·80 |
| Emu Vale | 1·44 | 20 | 0·25 | 1·72 |
| Jimbour | 1·65 | 28 | 0·59 | 2·45 |
| Miles | 1·99 | 31 | 0·25 | 2·95 |
| Stanthorpe | 1·79 | 43 | 0·70 | 3·13 |
| Toowoomba | 2·35 | 44 | 0·60 | 3·52 |
| Warwick | 1·67 | 29 | 0·31 | 2·01 |
| *Maranoa.* | | | | |
| Roma | 1·68 | 42 | 0·34 | 3·11 |
| *State Farms, &c.* | | | | |
| Bungeworgorai | 1·72 | 5 | 0·40 | 3·07 |
| Gatton College | 1·72 | 17 | 0·16 | 1·95 |
| Gindie | 1·67 | 17 | 0·49 | 1·29 |
| Hermitage | 2·07 | 10 | 0·40 | 1·95 |
| Kairi | 0·88 | 5 | 0·23 | 0·34 |
| Kamerunga | 2·72 | 26 | 0·35 | 0·95 |
| Sugar Experiment Station, Mackay | 2·55 | 19 | 0·64 | 2·10 |
| Warren | 1·97 | 5 | Nil | 1·82 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for June this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

# ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

## TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON.

| 1917. | MAY. | | JUNE. | | JULY. | | AUGUST. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·13 | 5·17 | 6·32 | 4·59 | 6·40 | 5·4 | 6·30 | 5·18 |
| 2 | 6·13 | 5·16 | 6·32 | 4·59 | 6·40 | 5·4 | 6·30 | 5·18 |
| 3 | 6·14 | 5·15 | 6·33 | 4·59 | 6·40 | 5·4 | 6·29 | 5·19 |
| 4 | 6·15 | 5·14 | 6·33 | 4·59 | 6·40 | 5·5 | 6·29 | 5·19 |
| 5 | 6·15 | 5·14 | 6·33 | 4·59 | 6·40 | 5·5 | 6·28 | 5·20 |
| 6 | 6·16 | 5·13 | 6·34 | 4·59 | 6·40 | 5·5 | 6·28 | 5·20 |
| 7 | 6·15 | 5·12 | 6·34 | 4·59 | 6·40 | 5·6 | 6·27 | 5·21 |
| 8 | 6·17 | 5·12 | 6·34 | 4·59 | 6·40 | 5·6 | 6·26 | 5·21 |
| 9 | 6·17 | 5·11 | 6·35 | 4 59 | 6·40 | 5·6 | 6 25 | 5 22 |
| 10 | 6·18 | 5·11 | 6·35 | 4·59 | 6 39 | 5·7 | 6·24 | 5·22 |
| 11 | 6·19 | 5·10 | 6·35 | 5·0 | 6·39 | 5·7 | 6 23 | 5·23 |
| 12 | 6·20 | 5·9 | 6·36 | 5·0 | 6·39 | 5·8 | 6 22 | 5·23 |
| 13 | 6·21 | 5·9 | 6·36 | 5·0 | 6·39 | 5·8 | 6 21 | 5 24 |
| 14 | 6·21 | 5·8 | 6·36 | 5·0 | 6·39 | 5·9 | 6·20 | 5·24 |
| 15 | 6·22 | 5·8 | 6·36 | 5 0 | 6·38 | 5·9 | 6·19 | 5·25 |
| 16 | 6 23 | 5·7 | 6·37 | 5·0 | 6·38 | 5·10 | 6·18 | 5·25 |
| 17 | 6·23 | 5·7 | 6·37 | 5·0 | 6·38 | 5·10 | 6·17 | 5·26 |
| 18 | 6·24 | 5·6 | 6·37 | 5·0 | 6·37 | 5·11 | 6·16 | 5·27 |
| 19 | 6·24 | 5·6 | 6·37 | 5·0 | 6 37 | 5·11 | 6·15 | 5·27 |
| 20 | 6·25 | 5·5 | 6·38 | 5·0 | 6·36 | 5·12 | 6 14 | 5·28 |
| 21 | 6·25 | 5·5 | 6·38 | 5·1 | 6 36 | 5·12 | 6·13 | 5·28 |
| 22 | 6·26 | 5·4 | 6·38 | 5·1 | 6·35 | 5·13 | 6 12 | 5 29 |
| 23 | 6·27 | 5·3 | 6·38 | 5·1 | 6·35 | 5·13 | 6·11 | 5·29 |
| 24 | 6·27 | 5·3 | 6·38 | 5·1 | 6·34 | 5·14 | 6·10 | 5·30 |
| 25 | 6·28 | 5·2 | 6·39 | 5·2 | 6·34 | 5·14 | 6·9 | 5·30 |
| 26 | 6·29 | 5·2 | 6·39 | 5·2 | 6·33 | 5·15 | 6·8 | 5·31 |
| 27 | 6·29 | 5·1 | 6·39 | 5·2 | 6·33 | 5·15 | 6·7 | 5·31 |
| 28 | 6·30 | 5·1 | 6·39 | 5·3 | 6·32 | 5·16 | 6·6 | 5·32 |
| 29 | 6·30 | 5·0 | 6·39 | 5·3 | 6·32 | 5·16 | 6·5 | 5·32 |
| 30 | 6 31 | 5·0 | 6·39 | 5·3 | 6·31 | 5·17 | 6·4 | 5·33 |
| 31 | 6 31 | 4·59 | ... | ... | 6·31 | 5·17 | 6·3 | 6·33 |

The times given are for the whole of Queensland, New South Wales, and Victoria, where the same Standard Time is observed.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 7 May | ○ | Full Moon | 12 | 43 | p.m. |
| 14 „ | ☽ | Last Quarter | 11 | 48 | a.m. |
| 21 „ | ● | New Moon | 10 | 47 | „ |
| 29 „ | ☾ | First Quarter | 9 | 33 | „ |

The Moon will be nearest the earth on the 14th, and at its farthest distance on the 28th.

| | | | | | |
|---|---|---|---|---|---|
| 5 June | ○ | Full Moon | 11 | 7 | p.m. |
| 12 „ | ☽ | Last Quarter | 4 | 38 | „ |
| 19 „ | ● | New Moon | 11 | 2 | „ |
| 28 „ | ☾ | First Quarter | 2 | 8 | a.m. |

The Moon will be nearest the earth on the 9th, and at its farthest distance on the 25th. It will cause a partial Eclipse of the Sun on the 19th, visible in the Arctic Regions but not in Australia.

| | | | | | |
|---|---|---|---|---|---|
| 5 July | ○ | Full Moon | 7 | 40 | a.m. |
| 11 „ | ☽ | Last Quarter | 10 | 12 | p.m. |
| 19 „ | ● | New Moon | 1 | 0 | „ |
| 27 „ | ☾ | First Quarter | 4 | 40 | „ |

The moon will be nearest the earth on the 7th, and at its greatest distance on the 22nd. There will be a *Total Eclipse* of the *Moon* from 6·51 to 8·27 a.m. on the 5th; but only the moon's entrance into the shadow of the earth will be seen in Eastern Australia.

| | | | | | |
|---|---|---|---|---|---|
| 3 Aug. | ○ | Full Moon | 3 | 11 | p.m. |
| 10 „ | ☽ | Last Quarter | 5 | 56 | a.m. |
| 18 „ | ● | New Moon | 4 | 21 | „ |
| 26 „ | ☾ | First Quarter | 5 | 8 | „ |

The moon will be nearest the earth on the 4th, and at its greatest distance on the 18th.

* For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during May, June, and July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

* These notes will not again be published until September, as they apply to the series from May to August.

# Farm and Garden Notes for September.

FIELD.—Spring has now arrived, and with it there will be the usual trouble with weeds, especially on carelessly prepared ground. Therefore, the cultivator and the horse and hand hoe must be kept vigorously at work to check the weed pests and save the growing crops as well as much future labour. Attend to earthing up any crop which may require it. There may possibly occur drying winds, dry weather, and even very late frosts, which have not been unknown in parts of this State even as late as September. Still, good showers may be looked for in October, and much useful work may be done during the present month which will go far to afford a fair prospect of a good return for labour. Plant out *Agave rigida*, var. Sisalana (sisal hemp plant), in rows 6 to 8 ft. apart, according to the richness of the soil. All dry places on the farm, too rocky or too poor for any ordinary crops, should be planted with this valuable aloe. Especially should limestone country be selected for the purpose. If the soil is very poor, and the plants very small, it is better to put the latter out into a nursery of good soil, about 1 ft. apart. Next year they will be good-sized plants. Keep down tall weeds in the plantation, and do not allow couch or buffalo grass to grow about the roots. Sisal will do no good if planted on low-lying wet land, or on a pure sandy soil. It thrives best where there is plenty of lime, potash, and phosphoric acid, all of which (except potash, unobtainable under present war conditions) can be cheaply supplied if wanting in the soil. Sisal requires so little labour from planting to maturity that it can be grown to good profit despite the high cost of white labour. The price of the fibre now ranges from £70 to £95 per ton for British East African, the Mexican being unobtainable. Sow cotton—Sea Island near the coast, and Uplands generally. Caravonica succeeds best in North Queensland. Sow maize, sorghum, imphee, mazzagua, Indian cane, prairie grass, Rhodes grass and paspalum, panicum, tobacco, pumpkins, and melons. Sugar-cane planting should be vigorously carried on. Plant sweet potatoes, yams, peanuts, arrowroot, turmeric, chicory, ginger, and canaigre, the latter a tuber yielding a valuable tanning substance. Plant out coffee.

KITCHEN GARDEN.—Now is the time when the kitchen garden will richly repay all the labour bestowed upon it, for it is the month for sowing many kinds of vegetables. If the soil is not naturally rich, make it so by a liberal application of stable manure and compost. Failing a sufficient supply of these, artificials may be used with good results. Dig or plough the ground deeply, and afterwards keep the surface in good tilth about the crops. Water early in the morning or late in the evening, and in the latter case, stir the soil early next day to prevent caking. Mulching with straw, leaves, or litter will be of great benefit as the season becomes hotter. It is a good thing to apply a little salt to newly dug beds. What the action of salt is, is not exactly known, but when it is applied as a top dressing it tends to check rank growth. A little is excellent for cabbages, and especially for asparagus, but too much renders the soil sterile, and causes hardpan to form. French or kidney beans may now be sown in all parts of the State. The Lima bean delights in the hottest weather. Sow the dwarf kinds in drills 3 ft. apart and 18 in. between the plants, and the climbing sorts 6 ft. each way. Sow Guada bean, providing a trellis for it to climb on later. Sow cucumbers, melons, marrows, and squash at once. If they are troubled

by the red beetle, spray with Paris green or London purple. In cool districts, peas and even some beetroot may be sown. Set out egg plants in rows 4 ft. apart. Plant out tomatoes 3½ ft. each way, and train them to a single stem, either on stakes, trellis, or wire netting. Plant out rosellas. Sow mustard and cress, spinach, lettuce, vegetable marrows, custard marrows, parsnips, carrots, chicory, eschalots, cabbage, radishes, kohl-rabi, &c. These will all prove satisfactory, provided the ground is well worked, kept clean, and that water, manure, and, where required, shade are provided.

FLOWER GARDEN.—Continue to plant bulbs as directed last month. Protect the plants as much as possible from cold westerly winds, which may still occur, notwithstanding the increasing temperature. Be careful that the bulbs do not come in contact with fresh manure. Keep a good lookout for slugs. Plant out chrysanthemums, palms, and all kinds of tropical and semi-tropical plants. If hot weather should ensue after planting, water and shade must be given. Sow dianthus, snapdragon, and coleus, seed or cuttings of the latter. Roses will now be in full bloom. Keep them free from aphis, and cut off all spent blooms. This latter work should be done in the case of all flowers. If you wish to save seeds, do not wait for the very last blooms, but allow some of the very best to go to seed. If you have any toads in the garden or bush-house, encourage them to take up their abode there. They are perfectly harmless, in spite of their ugliness, and they destroy an astonishing number of insects injurious to plants. Fill up all vacancies with herbaceous plants. Sow zinnia, gaillardia, amaranthus, cockscomb, balsam, sunflower, marigold, cosmos, summer chrysanthemum, coreopsis, portulaca, mesembryanthemum, calendula, &c.

# Orchard Notes for September.

## THE SOUTHERN COAST DISTRICTS.

The marketing of citrus fruits, in the later districts, of the late winter or early spring crop of pines and bananas, also of strawberries and Cape gooseberries, will continue to occupy the attention of fruitgrowers. We can only repeat the advice we have so often given in these Notes respecting the marketing of all kinds of fruit—viz., to grade the fruit evenly, pack honestly, and display it to the best advantage if you want to get good returns.

September is a very important month to the fruitgrower, owing to the fact that it is usually a dry month, and that it is essential in all cases to keep the land in a high state of tilth, so as to retain the moisture that is required by the various trees that are in blossom, thus securing a good set of fruit. Where irrigation is available, it is advisable to give the trees a good watering should the ground be dry, as this will induce a good growth and cause the fruit to set well. If an irrigation is given, it should be a thorough one, not a mere surface watering, and once the land is saturated the moisture must be retained in the soil by constant and systematic cultivation. If this is done, one good watering will usually be enough to carry the trees through in good condition to the thunderstorms that come later or even to the summer rains, if the soil is of a deep sandy loamy nature.

No weeds must be allowed in the orchard or vineyard at this time of the year, as they are robbing the trees and plants of both the water and plant food that are so essential to them at this period of their growth.

There is not much to be done in the way of fighting scale insects during the month, as they are more effectually dealt with later on; but where young trees are showing signs of distress, owing to the presence of scale insects, they should be treated, the gas method being the most efficacious.

Beetles and other leaf-eating insects often make their appearance during the month. The best remedy is to spray the trees or plants with one or other of the arsenical washes that are recommended by me in this Journal. The vineyard will require considerable attention. Not only must it be kept well worked, but any vines that are subject to the attack of black spot must be sprayed from time to time with Bordeaux mixture. Disbudding must be carefully carried out, as this work is equally as important as the winter pruning, as it is the best means of controlling the future shape of the vine. A very common fault with vines grown in the coast districts is that the buds often remain dormant, only the terminal bud and possibly one other starting into growth, thus leaving a long bare space on the main rods, which is undesirable. When this takes place, pinch back those shoots that have started, and which are taking the whole of the sap, and force the sap into the dormant buds, thus starting them into growth. This will result in an even growth of wood all over the vine—not a huge cane in one part and either a stunted growth or dormant buds on the rest.

Every care should be taken during the month to prevent the fruit-fly from getting an early start. All infested oranges, loquats, kumquats, or other fruits should be gathered and destroyed, as the keeping in check of the early spring crop of flies, when there are only comparatively few to deal with, will materially lessen the subsequent crops. Land that is to be planted to pines or bananas should be got ready now, though the planting need not be done till October, November, or even later. Prepare the land thoroughly; don't scratch the surface to the depth of a few inches, but plough as deeply as you have good surface soil, and break up the subsoil as deeply as you can possibly get power to do it. You will find that the extra money expended will be a profitable investment, as it will pay every time.

## THE TROPICAL COAST DISTRICTS.

September is usually a very dry month, and fruit trees of all kinds suffer in consequence. The spring crop of citrus fruits should be harvested by the end of the month, as, if allowed to hang later, there is a great risk of loss by fly. The fruit should be well sweated, and, if carefully selected, well-graded, and well packed, it should carry well to, and fetch high prices in, the Southern States, as there are no oranges or mandarins grown in Australia that can excel the flavour of the best of the Bowen, Cardwell, Cairns, Port Douglas, or Cooktown fruit.

As soon as the fruit is gathered, the trees should be pruned and sprayed with the lime and sulphur wash, as this wash is not only a good insecticide, but it will keep down the growth of all lichens, mosses, &c., to which the trees are very subject.

Every care should be taken to keep down the crop of fruit-fly during the month. All infested fruit should be gathered and destroyed, particularly that in or adjacent to banana plantations. Watch the

banana gardens carefully, and keep well cultivated. New land should be got ready for planting, and where land is ready planting can take place.

Papaws and granadillas are in good condition now, and, if carefully gathered and well packed in cases only holding one layer of fruit, they should carry well to the Southern markets if sent in the cool chamber.

## THE SOUTHERN AND CENTRAL TABLELANDS.

Prune grape vines at Stanthorpe in the early part of the month, leaving the pruning as late as possible, as the object is to keep the vines back in order to escape damage from late spring frosts. All vines subject to the attack of black spot should be treated with the winter dressing when the buds are swelling; this treatment to be followed by spraying with Bordeaux mixture later on.

Where fruit trees have not received their winter spraying, they should be treated at once before they come out into flower or young growth. Where the orchard or vineyard has not been ploughed, do so, taking care to work the land down fine as soon as it is ploughed, so as to keep the moisture in the soil, as the spring is always the trying time for fruit trees.

Look out for fruit-fly in the late oranges and loquats in the Toowoomba district. Keep the orchards and vineyards well cultivated; disbud the vines when sufficiently advanced. Spray for codlin moth.

In the Central tablelands irrigate vines and fruit trees, and follow the irrigation with deep, constant, and systematic cultivation. Keep down all weed growth, and fight the red scale on citrus trees with cyanide. The objective of the fruitgrowers throughout Queensland during September and the following months is, "How best to keep the moisture in the soil that is required by the trees, vines, plants, and vegetables"; and this objective can only be obtained by irrigation where same is available, or by deep, systematic, and constant cultivation where there is no water available for irrigation.

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We have received from Mr. A. E. Stephens, F.C.S., Director for Australia of the Chilian Nitrate of Soda Propaganda, the following comment on our article on "Fertilisers and the Value of Potash in Agriculture," by Dr. Voelcker. We feel sure that farmers and all others engaged in agriculture and market gardening will read the article with much interest, and also act on it.

## FERTILISERS IN WAR TIME—NITRATE OF SODA.

The extracts quoted in the July issue from Dr. Voelcker's paper, "Fertilisers and their Supply in War Time," which he read at the meeting of the Royal Society of Arts in London last March, are hardly applicable to Australia.

Dr. Voelcker's remarks applied essentially to conditions prevailing in Great Britain during war time.

In Australia at the present time nitrate of soda is more easily procurable and considerably cheaper per ton than sulphate of ammonia.

During the last twelve months over 9,000 tons of nitrate of soda have been imported into Australia, and although the price is £5 or £6 higher per ton—which is due to a corresponding increase in the shipping freights—than it was before the war, it can now be procured from all manure merchants at prices ranging from £19 to £21 per ton. The imports for the previous year were about 5,000 tons.

Sulphate of Ammonia is procurable only in limited quantities at prices varying from £25 to £28 per ton.

Comparing the utility of the two nitrogenous fertilisers in those localities where nitrogen is more or less a necessity, the conditions in Australia are again almost exactly the reverse of those in England.

Owing to the prevailing deficiency of lime in a great portion of our Australian soils the use of a nitrogenous fertiliser which has an alkaline base, like nitrate of soda, is to be preferred to an acid salt, like sulphate of ammonia, which latter makes great demands on the lime contents of the soil.

In Queensland, where it has been tried on sugar cane, nitrate of soda has already proved its immense crop increasing capabilities, and used correctly probably no other individual fertiliser can produce such striking increases in yield. For fruit and vegetable crops and maize the results in most cases also demonstrate the value of nitrate of soda.

Much more could be said of the merits of nitrate of soda over sulphate of ammonia, although the latter generally gets preference from manure manufacturers owing to its being better suited for incorporating in mixtures, the main base of which is superphosphate.

In the present unavoidable absence of potash manure, the property which nitrate of soda possesses in liberating otherwise insoluble potash which may exist in the soil should not be overlooked—a property which is not possessed by sulphate of ammonia.

It is only owing to the shortage of tonnage and the fact that practically the whole of the nitrate of soda now being imported into Great Britain is being requisitioned by the British Government for munition making purposes, that the different agricultural chemists and officials in Great Britain are trying to induce farmers there to use sulphate of ammonia instead of the invariably more favoured nitrate of soda for the purpose of manuring their crops—a state of affairs which has already been said does not at present apply to Australia, as your article in the July issue might possibly lead many people to believe.

Although the prices of fertilisers are generally higher all round than in pre-war time, it is practically only potash manures and basic slag that are unprocurable now in Australia.

Strong efforts are being made to discover some means of producing potash in Australia itself, and the manufacture of *basic*-superphosphate provides an even better substitute for basic slag.

The following is a list of the manures, other than proprietary mixtures, which are available:—

*Phosphatic Manures.*—Superphosphate, basic superphosphate.

*Phosphatic and Nitrogenous Manures.*—Bone dust, meat works fertilisers, blood and bone.

*Nitrogenous Manures.*—Nitrate of soda, sulphate of ammonia, dried blood.

QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## CULTIVATING THE COTTON CROP.

The cultivation of cotton after the crop has been properly planted and is up to a good stand is a very simple matter. The methods followed and the implements used in doing the work are unimportant, provided care is taken to keep the soil in best condition for the rapid growth of the plants. Some of the conditions that are important in the growing of cotton under boll-weevil conditions are the following:—

The highest temperature possible under existing weather conditions, good drainage, and keeping the cotton free from grass at every stage of its growth.

In order to maintain the best temperature and drainage it is necessary to plant the cotton on a bed and to keep this ridge up to a moderate height until as late as the middle or last of September. Late in the season flat cultivation can be given the crop. One very satisfactory method of cultivation to follow is to run a side-harrow around the cotton as soon as it is out of the ground. This will break any crust that may have formed on the soil, leave a good mulch of dirt around the little plants, and destroy all grass or weeds that may have come up. The side-harrow will have a tendency to flatten the beds and the middle should be ploughed out with a middle-breaker at once to guard against wet weather. This cultivation may be followed with a side-harrow and middle-breaker again, and it is not a bad plan to continue this until the middle of the growing season. Later a double-shovel or double cultivators may be substituted for the side-harrow and middle-breaker, using a small sweep next to the cotton

and a large one out in the middle. After the middle of September or October, or when the cotton is getting up to a fruiting stage, begin to practise flat cultivation with some form of diverse cultivator.

It is very important never to allow the soil to become hard or crusty. This may be accomplished by frequent cultivation and by always keeping two or three inches of loose dirt over the surface of the ground. Cotton should be ploughed every ten days. Once a week would be better. The width of the cotton rows should not be less than three feet on any land. A very good plan to follow in spacing rows is to give about the same width that the cotton will grow in height. The chopping or first hoeing of cotton should not be done until danger of cold weather has passed and there are four to eight leaves on the cotton. On ordinary land where cotton will grow from two to three feet high, ten or twelve inches is wide enough space to allow, and on the richest land two feet is ample space.

## THE SPACING OF COTTON TO GET THE BIGGEST YIELD.

For years there has been controversy on the spacing of cotton in order to obtain the greatest yield. In the old days of cotton-growing in Queensland, cotton was often spaced to 6 feet by 3 feet, whether Sea Island or Uplands. To-day experience shows that generally cotton gives the greatest yield when planted in close spacing. The following article on this subject, taken from "Cotton and Cotton Oil News," Dallas, Texas, U.S.A., is well worthy of study by cotton growers in Queensland. The experiments and the results refer to Uplands, not Sea Island cotton, and it should also be noted that the boll-weevil does not occur in Queensland cotton fields.

Recently there has come to us a Mississippi Experiment Station Bulletin which gives in detail the results of cotton experiments at three Mississippi stations in 1916. The results obtained from spacing cotton different distances under boll-weevil conditions are of particular interest.

At the Central Station, latitude 33½ north, on valley land of moderate fertility that had been in cotton several years, the following results were obtained:—

WIDTH OF ROWS.

| | Per Acre. |
|---|---|
| 3-ft. rows .. .. .. | 620 lb. of seed cotton |
| 3½-ft. rows .. .. .. | 540 lb. of seed cotton |
| 4-ft. rows .. .. .. | 490 lb. of seed cotton |
| 4½-ft. rows .. .. .. | 480 lb. of seed cotton |
| 5-ft. rows .. .. .. | 400 lb. of seed cotton |

The plants in the above plat, thinned to 12 inches in the drill, grew approximately 4 feet high.

DISTANCES IN THE DRILL.

| | Per Acre. |
|---|---|
| 12 in. .. .. .. .. | 576 lb. of seed cotton |
| 24 in. .. .. .. .. | 480 lb. of seed cotton |
| 36 in. .. .. .. .. | 450 lb. of seed cotton |

Rainfall during the month of July amounted to 12·63 inches, or nearly two and one-half times the normal, and boll-weevils were very destructive.

At the Holly Springs Station, latitude 35 north, on rather highly fertilised land, the following were the results:—

| Variety. | Width Row. | Distance in Drill. | Total Lb. Seed Cotton per Acre. |
|---|---|---|---|
| Triumph .. .. .. | 3 ft. | 9 in. | 1,135 |
| Cleveland Big Boll .. .. | 3 ft. | 9 in. | 1,290 |
| Sproull's Big Boll .. .. | 3 ft. | 9 in. | 1,161 |
| Triumph .. .. .. | 3½ ft. | 12 in. | 1,304 |
| Cleveland Big Boll .. .. | 3½ ft. | 12 in. | 1,632 |
| Sproull's Big Boll .. .. | 3½ ft. | 12 in. | 1,323 |
| Triumph .. .. .. | 4 ft. | 16 in. | 1,274 |
| Cleveland Big Boll .. .. | 4 ft. | 16 in. | 1,467 |
| Sproull's Big Boll .. .. | 4 ft. | 16 in. | 1,158 |
| Sproull's Big Boll .. .. | 4 ft. | 9 in. | 1,255 |
| Sproull's Big Boll .. .. | 3½ ft. | 12 in. | 1,304 |
| Sproull's Big Boll .. .. | 3 ft. | 16 in. | 1,367 |

In regard to the above, Professor Ames, of the Holly Springs Station, says:—"As may be seen from the table, the best yields were secured from the drill. Spaced in this way there are 3½-foot rows with the plants spaced 12 inches in the approximately 12,000 plants on an acre. The varieties used in this test are all rather leafy and growthy. The land, too, was rather highly fertilised. On poorer land with less growthy plants the results would probably have been different."

At the Mississippi Delta Station, on rich loam land, the following results are reported, all rows being 3 feet and 9 inches wide:—

| Variety. | Distance in Drill. | Seed Cotton per Acre. |
|---|---|---|
| Express-41 .. .. .. | Unthinned .. | 1,330 |
| Express-41. .. .. .. | 6 in. .. | 1,470 |
| Express-41 .. .. .. | 12 in. .. | 1,400 |
| Express-41 .. .. .. | 18 in. .. | 1,470 |
| Trice .. .. .. | Unthinned .. | 1,715 |
| Trice .. .. .. .. | 6 in. .. | 1,750 |
| Trice .. .. .. .. | 12 in. .. | 1,680 |
| Trice .. .. .. .. | 18 in. .. | 1,610 |
| Lone Star .. .. .. | Unthinned .. | 770 |
| Lone Star .. .. .. | 6 in. .. | 805 |
| Lone Star .. .. .. | 12 in. .. | 1,120 |
| Lone Star .. .. .. | 18 in. .. | 1,050 |
| Columbia .. .. .. | Unthinned .. | 945 |
| Columbia .. .. .. | 6 in. .. | 945 |
| Columbia .. .. .. | 12 in. .. | 1,015 |
| Columbia .. .. .. | 18 in. .. | 1,085 |

Commenting on these results, Director G. B. Walker says:—"Though the results from this experiment are not conclusive, it appears that with the early dwarf varieties, like Trice, close spacing will give the

highest yields, especially where only the early fruit can be counted on. The later, large-leaved varieties appear to yield better if given more space."

Turning now to Louisiana, where for twelve years farmers have had to fight the boll-weevil for the cotton crop, we find the following interesting results obtained by Newell, of the Louisiana Experiment Station:—

In 1907, on sandy loam upland at Mansfield, Louisiana, with Triumph cotton fertilised with a mixture of 200 lb. acid phosphate and 100 lb. cotton seed meal per acre, with cotton in rows 6 feet apart and plants 18 inches in the drill, the yield was 734 lb. seed cotton per acre; in 4-foot rows and plants 12 inches in the drill, 892 lb. per acre; and in 3-foot rows and plants 10 inches in the drill, 947 lb. per acre.

The next year the same land was planted to the same variety of seed and similarly fertilised, with the following results:—Six-foot rows, plants 20 inches in the drill, made 838 lb. of seed cotton per acre; 4½-foot rows, plants 15 inches in the drill, 993 lb. per acre; and 3-foot rows, plants 12 inches in the drill, 1,344 lb. per acre.

In 1908 a similar test with Triumph cotton was conducted on sandy chocolate land, fertilised with 300 lb. of acid phosphate per acre, at Mansura, Louisiana, with the following results:—Six-foot rows, plants 18 inches in the drill, yielded 474 lb. of seed cotton per acre; 4-foot rows, plants 10 inches in the drill, 621 lb. per acre.

The same year a similar test with Triumph cotton, unfertilised, was conducted on rich alluvial land at Bayou Pierre, Louisiana, with the following results:—Seven-foot rows, plants 24 inches in the drill, yielded 308 lb. of seed cotton per acre; 4½-foot rows, plants 15 inches in the drill, 553 lb. per acre; and 3½-foot rows, plants 12 inches in the drill, 636 lb. per acre.

These experiment station results, when we bear in mind that they are in line with similar results obtained by other stations both in and out of boll-weevil territory, indicate quite clearly that on average lands rather close spacing will give the largest yields. Certainly the old advice, "Space wide and let the hot sunshine kill the weevil," is bad.

[The moral for Queensland cotton growers, who have not the boll-weevil to contend with, is still "To space wide is bad."—ED. "Q.A.J."]

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## THE COTTON CROP, 1916-1917.

The Agricultural Department, in reply to advertisement, received early in August several tenders for the cotton which was being ginned by the Department, and the Minister accepted the highest tender of 11d. per lb. for the cotton, delivered in Brisbane. The successful tenderers were Messrs. Foy and Gibson, Brisbane. An accurate calculation was not possible until ginning operations were concluded, and considerable quantities of seed cotton were still coming in. It was estimated, however, that the return to the growers would be about 3½d. per lb. of seed cotton, as against a fraction over 2½d. last year. It was at first estimated that

the total of ginned cotton would be about 17,000 lb., but since cotton came in very freely it was estimated to reach about 30,000 lb. Last year the growers received a net return of 2·54d. per lb. of raw cotton, which at the low average of 1,000 to the acre is equal to £10 11s. 3d. per acre. The average cost of planting, cultivating, and harvesting a 1,000 crop is estimated at £2 16s. 11d. The net return to the growers of the 1916 crop was £7 14s. 9d. per acre. The planting season is now upon us, and those who require seed should apply to the Department, and it will be supplied free of cost. About 10 lb. of seed—a generous allowance—are needed for an acre, which under ordinary circumstances should return at least 1,000 of seed cotton. Much larger returns have been made in Queensland, especially during the 1907 season, when the following yields per acre were obtained:—At Wallumbilla, 2,240 lb.; Tallegalla, 4,250 lb. and 3,527 lb.; at Vernor, 3,006 lb., 1,473 lb., and 1,300 lb.; Mackay, 1,368 lb. Similar results were obtained in 1915, but only on a limited scale.

Intending growers who have the Department's pamphlet on cotton-growing should note particularly the remarks on "The New System of Cotton Cultivation" to ensure the production of an earlier crop and increased yield.

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## THE COTTON OUTLOOK FOR 1917-1918 IN THE UNITED STATES OF AMERICA.

Reports from the cotton belt are anything but encouraging. Low temperatures have been experienced in many sections, which have further accentuated the lateness of the crop. This is most disquieting when the need for a large yield is so essential.

Reports advise the steady migration from the South to the North of negroes, and it is estimated that 309,000 have left the cotton belt during the last eight months.

The successful prosecution of the war is receiving greater attention than trade, but this cannot continue indefinitely. The strong statistical position of cotton, which will be emphasised by the probability of the new crop being inadequate to provide a surplus over requirements, must command attention. Everything points to the cotton supply position during the next eighteen months occasioning the cotton trade of the world anxiety.

The stocks of manufactured goods throughout the world are acknowledged to be low. Consequently at some future date replenishment must take place.

The probability is that demand from countries other than Europe would be large, given reasonable facilities for trading. Therefore, in looking ahead, it would be unwise to place the world's requirements of American cotton under 14,500,000 to 15,000,000 bales.

The importance of augmenting the cotton supply has been repeatedly urged, but never before was the necessity so urgent as at present to avert a shortage.

## LINTERS AND GUN COTTON.

The processes through which cotton passes in its preparation for use in the manufacture of guncotton are described in the following statement which was prepared by the United States War Department:—

"The cotton used in explosives manufacture consists of unspun short fibres, generally the linters and hull fibres which remain after the earlier ginning has removed the longer fibres more valuable for spinning and less suited to the manufacture of explosives. As an example of the treatment of this material, the United States Army specifications for smokeless powder require that the cotton be purified and bleached and thoroughly washed to remove the purifying and bleaching materials, salts, &c., and that, as the result, the cotton shall contain not more than 0·4 per cent. of extractive matter, not more than 0·8 per cent. of ash, and not more than 'traces' of lime, chlorides, sulphates, &c., also that it be of uniform character, clean, and free from such lumps as would prevent uniform nitration. It is delivered to the explosives factory in bales, sometimes compressed, sometimes not, but always covered with paper or other material for protection from dirt.

"In making smokeless powder or explosives, the cotton generally after being run through a picking machine to separate the fibres is dipped into nitric and sulphuric acids to nitrate it, producing nitro-cellulose, which is then washed, boiled, cut in a beater or pulping machine, further washed, and then wrung in a centrifugal. Up to this point the only important difference depending upon use is the degree of nitration, being more highly nitrated if for use as a high explosive. Such nitrocellulose, generally called military gun-cotton, is usually after the foregoing operations completed by pressing into blocks. If for smokeless powder the nitrocellulose must, however, be thoroughly dehydrated, mixed with a suitable solvent, and worked to a very stiff paste or colloid, either alone or mixed with other ingredients (nitroglycerine, &c.), and is then forced from a hydraulic press through dies and cut into grains of desired length, and dried."—"Cotton," official journal of the Manchester Cotton Association.

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## KUDZO.

To an exchange Mr. B. Harrison, F.R.H.S., contributes the following information concerning Kudzo, a plant which, because of its drought-resisting and soil-enriching properties, is claiming attention in various parts of Australia:—

The plant is a native of Japan, where it is a leading crop, and it is also highly commended by the United States authorities. This is a perennial vine, and its numerous merits, compared with lucerne, which is styled the "king of fodder plants," are many. It succeeds in any class of soil, if drained, does not require any fertiliser, it rapidly enriches poor soil, it does not require to be cut at a certain time to save it. It will

transform poor soil or barren hillsides into profitable use. it makes good permanent pasture, and it is not injurious to stock at any stage—either green or dry—and when fed to cows it will produce more and richer milk than any other single feed, as it is more nutritious than either lucerne or bran. It is said that in the United States it has produced four cuttings of 2½ tons each per acre annually. It is very drought-resistant, as it roots deeply, and the vines cover the ground with foliage which acts like mulch and conserves moisture. It is also said that land planted with kudso soon becomes like the rich soil that has recently been cleared from the virgin forest, and it becomes richer each year through the large quantity of nitrogen deposited therein. It should be cultivated in rows 8 ft. apart the first season, after which it will require but little attention.

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## IS A MECHANICAL COTTON-PICKER POSSIBLE?

Many attempts to invent a mechanical cotton-picker have been made, and several machines have been patented that will pick cotton, but none as yet has proven practical. The best of them either do too much damage to the stalks or they are too costly to operate.

Up to date the Southern negro has proven the best and cheapest cotton-picker.

No mechanical device has yet been found to take his place in gathering cotton. It might be rash to say that no mechanism can be invented that will pick cotton successfully and at a cost that will justify its use in the field.

Man has made other successful inventions that appear to be as intricate and as difficult as it is possible for machinery to be, yet a really practical, successful cotton-picker seems to defy the inventive genius of man.

Why should a cotton-picking machine be more difficult to make than the cotton gin, the sewing machine, the great self-binding reapers that harvest our grain for us, or the mighty printing presses that print and fold thousands of newspapers an hour? What is peculiar about the picking of cotton that renders a machine for the purpose any more difficult to construct than the inventions mentioned?

The answer to these questions may furnish the crux of the difficulty and yet leave the problem as far from solution as ever. In all the many useful machines that serve the purposes for which they were devised the material on which they operate is fed to them mechanically, but the machine that picks cotton must hunt the material on which it is to operate in a wilderness of foliage, branches, and bolls. Can a machine be made to do this successfully? *Quien sabe?*—"Cotton and Cotton Oil News."

# MARKET GARDENING.

## CROPPING A 10-PERCH ALLOTMENT.

Many people who have not previously had a garden are now endeavouring to grow vegetables on a small allotment, and some are, naturally enough, puzzled as to what quantities of the different kinds of vegetables it is possible to grow. The following article and plan of a garden which we take from the "Journal of the Board of Agriculture," London, are as applicable to Queensland as to England. They are based mainly on the assumption that most people will desire to grow several of the simple crops, in addition to potatoes. In the accompanying plan, the ground allotted to potatoes amounts to a little less than half the 10 perches, or just over 4½ perches. This area can easily be increased at the expense of the other crops, and, in particular in place of peas, for which the ground allotted adjoins the potato patch. Where manure is not too plentiful, legumes, *i.e.*, peas and beans, are of great value, since they collect nitrogen for other crops; hence the apparently large area devoted to these crops. After they are removed the ground may be dug and prepared for the small seeds of the following season, and for the second year the potatoes may be removed to the other end of the allotment, while the legumes should be removed to the patch now set out for potatoes. Many variations of the plan are possible. No ground has been set out for such crops as spinach, leeks, celery, &c., nor for salad crops, except as regards the vacant ground between peas and beans. The crops indicated are the staple crops of the garden, but others may be planted as the season for some of them is over, or space may be found on the border of some of the beds for salad crops and herbs, eschallots, as well as for a few bush marrow plants.

As regards manure, dung is the best all-round manure, and may be applied at the rate of 1 cwt. per perch. As a substitute there are many kinds of artificial manures which are normally used. Nitrates produce fine, luxuriant foliage, *e.g.*, they are useful for the cabbage and similar crops; phosphates induce earlier production of fruit and flowers, and will be found most useful with beans, peas, turnips, parsnips, &c.; while potash increases the substance and improves the quality of fruits, tubers, and roots, and it is excellent for potatoes. Guano is the best artificial fertiliser for the garden, as it contains all three of the plant foods mentioned. Pigeon and poultry dung are good substitutes. These may be applied at the rate of 4½ lb. to 7 lb. per perch. They should be mixed and pulverised with some fine, dry material, such as earth ashes or fine coal ashes. Wood ashes contain considerable potash, and for potatoes should be applied at the rate of about 4 lb. per perch. Heavy soils are benefited by lime. This may be applied at the rate of 2 to 5 bushels per 10 perches. It is best applied before the crop is planted, and thereafter it may be sprinkled on the top of the ground in small quantities. Fresh gas-lime is injurious to vegetable life.

As two crops of potatoes are anually raised in Queensland—the summer and the winter crops—a different rotation would be needed.—(Ed. "Q.A.J.")

Cropping—a 10 Perch Allotment.

| No. of rows. | Crops. | Distance between rows. | 33 ft. | Space Allotted |
|---|---|---|---|---|
| 3 | Parsnips | 15 ins. | Approximate number of plants 150 | 3 ft 9 ins. |
| 3 | Carrots | 12 ins. | 230 | 3 ft. 3 ins. |
| 4 | Turnips | 12 ins. | 132 | 4 ft. |
| 2 | Beetroots | 12 ins. | 66 | 2 ft. |
| 6 | Onions | 12 ins. | 400 small to 600 medium size | 6 ft. |
| 4 | Broad Beans | 18 ins | At 4 ins. 400<br>At 6 ins. 260 | 6 ft. |
| 3 | Dwarf Beans | 18 ins | 99<br>(or Early Brussels, 36) | 4 ft. 6 ins. |
| 2 | Runner Beans | 3 ft | At 6 ins. 132<br>At 9 ins 88 | 6 ft |
| 3 | Early<br>Mid Season<br>Late<br>Peas | 3 ft | At 2 ins 600<br>At 4 ins 300 | 9 ft. |
| 4 | Early Potatoes | 2 ft | At 12 ins 32 per row<br>At 9 ins 42 per row | 8 ft. |
| 4 | Second Early Potatoes | 2 ft. 6 ins | At 12 ins 132<br>(Brussels Sprouts, 16 per row.) | 10 ft. |
| 8 | Main Crop Potatoes | 2 ft 6 ins | At 12 ins 32 per row<br>At 15 ins. 26 per row<br>At 18 ins. 22 per row<br>(Kale etc., 16 per row) | 20 ft. |
| | | | Total | 82 ft 6 ins |

82 ft 6 ins

LAYING OUT THE GARDEN.

## ECONOMY IN THE USE OF SEEDS.

It is important in the national interest that everyone who is sowing vegetable seeds should exercise economy in order that no more seed should be sown than is necessary. In ordinary times, when seed is both plentiful and cheap, it is often used with a free hand, but at the present time the seeds of many vegetables are neither plentiful nor cheap, and it is therefore not only a wise economy but also a duty to make seed go as far as possible.

The following hints will be of use in this connection:—

1. The seeds of many vegetables, especially if they are from a good harvest, retain their germinating power almost unimpaired for several years. This is true, for example, in the case of seeds of leguminous food plants—peas, beans, scarlet runners, French beans, &c. Therefore, before opening this year's seed packets, seeds of these kinds of vegetables left over from last year's seed order should be tested in order to ascertain whether they will germinate well or not. This is very easily done. All that is necessary is to line two saucers with pieces of flannel or with blotting-paper and to moisten, but not thoroughly to wet, the flannel or blotting-paper. A known number of seeds (20 or 30) should be placed, well separated from one another, in one of the saucers. The other saucer is then inverted on the one containing the seeds, and the saucers are stood in a moderately warm place, and to prevent drying up by evaporation may be covered with a bowl, jar, or newspapers. The germination will be quicker if before the seeds are placed in the saucer they are soaked in water until they have "plumped up"—for example, they may be soaked over night. After a day or two, the saucers being examined daily, the seeds which have begun to sprout are counted and removed. The rate of each seed's germinating varies very much according to the kind, so that the test must run on for a time, varying from two or three days to ten days or a fortnight. If a fair proportion of last year's seeds germinate they should be sown, and this year's seeds may be kept in their unopened packets for use next year.

2. Seeds should be sown as thinly as possible, but at the same time it must be remembered that if sown too thinly there may be gaps when the seedlings come up.

3. It should be remembered that many seedlings transplant quite well, so that carefully lifted thinnings can be used to increase the number of rows.

4. Care should be taken to ensure that there is no wasteful use of such seeds as those of cauliflower. At the same time, large gardeners should remember that a few dozen seedlings (good varieties) of cabbages and savoys are often a welcome gift to the smaller gardeners in their neighbourhood.

5. Anyone who has parsnips, beet, carrots, leeks, celeriac, or cabbages sown last year should leave some of each of these plants in the ground, let them run to seed, and if they do seed should be saved. Home-saved seed should, if possible, be protected from birds, and should be allowed to ripen thoroughly, should be harvested when ripe, and all the bad seed picked out and burnt, and the rest kept away from the air in a cool, dry place. The risk of disappointment in some cases owing to a wet autumn is well worth taking.

6. Another point which amateurs would do well to remember is that mice are very fond of certain kinds of seeds—certain peas, for instance. The seed should be slightly moistened and mixed with a little red lead so that the seed is avoided by vermin. Birds also are very apt to peck and destroy seedlings. Where netting is not available, three or four strands of black cotton stretched over the rows on sticks will often serve to keep birds away.—"Journal of the Board of Agriculture."

# NEGLECTED INDUSTRIES.

## THE PRODUCTION AND INDUSTRIAL EMPLOYMENT OF VEGETABLE OILS.

When we consider the large quantities of various vegetable oils annually imported into Queensland for use in a variety of industries, and that all the plants producing such oils find a congenial home in all parts of the State, according to the necessary climatic conditions, it is remarkable that no enterprising capitalists or companies have as yet not turned their attention to utilising these resources by manufacturing a product which is of first-class or of considerable industrial importance. The principal vegetable oils and their sources are discussed in the following article which appeared in "The Engineer" (16th February, 1917):—

### LINSEED.

Linseed is undoubtedly one of the most important, if not the most important oil known to man, and is derived from the seeds of the flax plant. This plant is cultivated in two distinct forms, one more richly flowered than the other, and therefore grown for the sake of the seeds. This variety is chiefly cultivated in Russia, India, Canada, the United States, and the Argentine. The Russian, particularly from the Baltic district, is perhaps the most highly esteemed source of linseed oil. The seed contains from 38 to 40 per cent. of oil. The oil is recovered from the seed very commonly by hot pressing. The hot press cake retains about 10 per cent. of the oil, and forms an extremely valuable and wholesome cattle food. Occasionally the seeds are pressed cold for the recovery of an edible oil. The hot pressed oil is of wide application in the arts, and is used extensively in the manufacture of soft soaps. Its high specific gravity and its fine drying qualities make it of first importance in the manufacture of paints and varnishes. The chemical changes which occur when linseed oil "dries" are not clear, but it is certain that the main feature is the oxidation of the oil. The oxygen is taken up rapidly, and transforms the oil into a flexible solid mass, known as "linoxyn," which is manufactured on a large scale, for it is the principal raw material of the linoleum and oil-cloth industry. In the natural state linseed oil dries to an elastic skin in about three days. If, however, it is prepared by heating it with various salts of lead or manganese, it will dry within six or eight hours. So treated, it is known as boiled oil, and is much used by painters and artists.

### COTTON SEED OIL.

This oil has a claim to be ranked next in importance to linseed oil. It is obtained from the seeds of the cotton plant. The Egyptian and Sea Island cotton plants yield a black seed, while the American and Indian seeds leave the cotton gin with a considerable amount of the fibre still adhering to them. This is removed by a special machine. The husks also are removed before crushing the kernels. On an average, the amount of oil which the latter contains ranges from 18 to 24 per cent. according to the plant producing them. The residue left after milling the seed for

the oil retains all the fertilising properties, and is largely used as manure for sugar-cane, cotton, corn, tobacco, and so on, but it is found that the most economical manner of using it is to feed it to cattle, and to use the resulting manure, which contains 80 to 90 per cent. of fertilising value, on the land.

Cotton seed oil is a so-called semi-drying oil which absorbs oxygen slowly, but by blowing air through it at about 100 degrees cent., the absorption can be increased. Blown cotton seed and other semi-drying oils, similarly treated, become thickened and appear like castor oil. They are produced on a large scale, and when dissolved in light mineral oils are used as lubricants for machinery.

Refined cotton seed oil is in extensive use for edible purposes. It appears on the table as salad oil, it is used by the sardine tinning industry, and under the name of butter oil it forms one of the chief raw materials of the margarine manufacturer and of the manufacturer of lard substitute, or compound lard as it is called. Apart from the very great use of cotton seed oil for edible purposes, its chief industrial employment is in the soap-making industry. It is frequently used in this connection by itself. As an ingredient of toilet soap it is commonly mixed with tallow or coconut oil. It is also widely used in the manufacture of soap powder.

## OLIVE OIL.

Olive oil is in several respects chemically and industrially closely similar to cotton seed oil. The latter being cheaper is frequently substituted for it, notably for edible purposes. The reputation of olive oil as an edible oil is, however, too great for it ever to be supplanted completely by any other. The olive tree is chiefly cultivated in the countries bordering the Mediterranean. The fruit of the olive consists of rind, flesh, stone, and seed kernel. All parts contain oil. The fleshy part, forming 80 per cent. of the whole, contains from 40 to 60 per cent. of oil, and yields the best oil for edible purposes. To produce this oil the fruit is gathered before it is quite ripe, and is peeled and stoned. The flesh is then pressed by itself. The kernels are crushed separately, and yield an inferior "olive kernel oil." The pulp left after the pressing of the flesh may contain as much as 20 per cent. of oil. It is ground up with hot water and allowed to stand until the broken-up cellular tissue rises to the surface. This is again pressed for a second-quality oil. The residue is finally extracted with solvents, commonly carbon disulphide. Such extracted oil acquires a deep green colour from the chlorophyll in the fruit, and is principally used for soap-making. In some mills the original fruit is not stoned before being pressed for the first time, but is crushed as a whole. The oil yielded is of a less perfect quality than that obtained by the other process, for it contains the poorer oil derived from the kernels.

The oil derived from the first pressing of the fruit is almost invariably used for edible purposes. A second or third pressing is commonly adopted. The oil so obtained is used for soap-making and for lubricating and burning purposes, for olive oil is a non-drying oil. The press cake is sometimes used locally as a cattle food. The value of the oil,

however, makes it pay to carry the recovery to the greatest possible extent. Hence the last drop of oil is usually recovered by the chemical solvent process.

### CASTOR OIL.

The castor oil tree or shrub—it is found in both forms—grows in all tropical and subtropical countries. The seeds are enclosed in a rough outer shell, and consist of a husk containing a soft, white kernel, constituting 80 per cent. of the seed, and yields from 46 to 53 per cent. of its weight in oil. The husks are oilless. The oil is of the non-drying class, and is of great value as a lubricant. It is extensively used in the soap industry. Its medicinal use depends on the fact that it contains an alkaloid. This alkaloid in excess is poisonous, hence the residue left after crushing the seeds is unfit for cattle food. Hence the oil residue in it is extracted by solvents, such oil being suitable for soap-making and other technical purposes. The ultimate residue is used as manure.

Castor seeds are commonly pressed cold to obtain medicinal oil, and then pressed a second or third time in a hot condition to obtain technical quality oils.

### AFRICAN OIL PALM OIL.

The fruit of the African Oil Palm consists of a fleshy outer layer or pericarp surrounding a hard woody shell within which is the seed kernel. Roughly, the shell forms 50 per cent. of the whole, the fleshy pericarp 35 per cent., and the kernel 15 per cent. Of the pericarp, 50 per cent. or so is oil, while the kernel yields about 45 per cent. In the case of the olive, the oils recovered from the fleshy part and from the kernels are practically the same. In the case of the palm-tree fruit, they are quite different. Palm oil, the product obtained from the pericarp, is used principally in the making of soap and candles. The pericarp, owing to its nature, has to be worked up as soon as the fruit is pulled. Consequently, the factory is placed near the plantation. The kernels, separated from the pericarp, are shipped to the United Kingdom, and (before the war) to Hamburg, &c., and are treated by crushing and extraction with solvents for the recovery of the oil. This oil, in a fresh condition, is largely used in the manufacture of margarine, and, to a considerable extent, when suitably treated, in the manufacture of chocolate. The poorer qualities and the extracted oil are suitable for soap, candle, and paint-making. Palm kernel oil-cake is somewhat deficient in nitrogen, so that its value as a cattle food is less than that of some other qualities of cake. This deficiency also renders the residue from the extraction process of low value as a manure.

### COCONUT OIL.

Coconuts are obtained from a tree of the palm family, not, of course, from the cocoa (or cacao) tree. The fleshy layer inside the nut, dried, either in the sun or by artificial heat, is known as "copra." The undried flesh contains about half its weight of water, so that, by drying it—an operation carried on at the place where the nuts are gathered—a considerable saving of freight is effected. The copra shipped to the oil

mills is shredded and crushed hot. It yields round about 64 per cent. of its weight in oil, but this figure is subject to variation accordingly to the precise method adopted for drying the copra by the gatherers. Coconut oil is very closely similar to palm kernel oil, and is used for much the same purposes, that is to say, chiefly in the making of margarine and soap. These three oils, palm, palm-kernel, and coconut oils, are all of the non-drying type, and are to be regarded as vegetable fats rather than as oils.

It may be noted here, that although coconuts do not grow on cocoa trees, still, coconut oil—and also palm kernel oil—is of great value to the chocolate manufacturer. The cocoa bean, when roasted and ground, contains about 50 per cent. of fat, or "cocoa butter," as it is called. This fat renders the cocoa powder difficult of mixture with boiling water and indigestible. It is, besides, a valuable substance in itself, being used in medicine and soap-making. Hence it is frequently removed to the extent of about half its original amount by submitting the ground cocoa powder to hydraulic pressure. In working up the cocoa powder into chocolate of the best quality, a portion of the extracted cocoa butter is returned to it. In other chocolates the valuable cocoa butter is omitted, and coconut oil, suitably treated, or palm kernel oil, is used instead.

## SOYA BEAN OIL.

The Soya Bean plant flourishes in Manchuria, China, and Japan. In Manchuria, the cultivation of the plant is stated to have been the main agricultural industry for centuries, while the production of soya bean oil and oil-cake formed the most important manufactures of the country. The bean cakes have for long formed one of the chief articles of food for the inhabitants. Nevertheless, the bean and the oil it yields were almost unknown in Europe until the Russo-Japanese war. Since then the production and use of soya bean oil and soya bean cake have developed phenomenally. The oil in Europe now rivals that obtained from the cotton seed, while the cake, on the Continent at least, is contesting the position as a food for milch cows held by linseed and cotton seed cake. The oil belongs to the semi-drying class, and is used for edible purposes, as an illuminant, in soap-making, and in the manufacture of linoleum. The bean contains about 18 per cent. of oil, and in the press yields from 10 to 13 per cent.

## RAPE OR COLZA OIL.

The rape plant is grown extensively in many European countries, notably in Russia. It is cultivated in British India to an extent which renders the annual crop second only in importance to the linseed crop. The bulk of the Indian seed is shipped to England, but Germany used

to have a preponderating hold on other sources of supply. Rape oil belongs to the semi-drying class, and is principally used for burning purposes and as a lubricant. In the latter case the oil is frequently "blown," as mentioned above under cotton seed oil. To a small extent rape oil when obtained by "cold drawing" is used for edible purposes, notably by bakers in the production of bread. It is commonly employed as a quenching medium for steel plates, &c., and on the Continent is used occasionally in the manufacture of soft soap. The seed contains anything from 33 to 43 per cent. of oil. It is frequently extracted by means of solvents. The oil apparently contains a poisonous element. Consequently rape seed cake is not greatly valued as a cattle food. It may, in fact, be said that the bulk of the residue left after either crushing or extraction with solvents is used as a manure.

### MUSTARD OIL.

This oil is obtained from the black, white, or wild mustard plant, and is used in soap-making and as a substitute for or adulterant in rape oil, with which it is closely similar. The cake left after crushing is, however, a more important product than the oil. When ground, this cake gives the mustard of the domestic table.

### SUNFLOWER OIL.

The sunflower is cultivated for the sake of its seeds on an immense scale in Russia, Italy, India, and China. The seeds, raw or roasted, are used in Russia as an article of diet. The oil recovered from them by crushing is, when refined, considered by some to equal olive oil for edible purposes. Its chief use, however, is in soap and candle-making. The seeds contain from 20 to 23 per cent. of oil. For cattle-feeding purposes the cake is not only very palatable, but being rich in nitrogenous matter is of great food value. Sunflower oil belongs to the drying class. The sunflower is very readily cultivated, and produces a high yield of seeds. It is believed that the Central Empires, cut off as they are at present from many important sources of oils and fats, are cultivating the sunflower on an extensive scale in an attempt to reduce the deficiency. They are probably growing flax—for linseed oil—also on a considerable scale; but flax, it is to be noted, rapidly exhausts the soil and is, therefore, in all likelihood being cultivated to an extent only slightly greater than in peace time. It may perhaps be added that the rumours recently in circulation as to Germany's shortage of glycerine and the horrible means she is adopting to make it good cannot be accepted as true by those qualified to judge. In the first place Germany uses

little or no glycerine in the production of her explosives, differing in this respect from this country which, of course, depends extensively upon nitro-glycerine. In the second place the yield of glycerine from the source suggested would be altogether too insignificant to justify the cost, trouble, and difficulty of recovering it.

### POPPY SEED OIL.

The seed of the poppy contains from 45 to 50 per cent. of an oil which, when "cold drawn," is almost colourless, has little odour, and possesses a pleasant taste. It is in extensive use on the table as a salad oil, and is highly valued by artists and artists' colourmen. The seeds are usually expressed twice, the second pressing being carried out hot and yielding an inferior oil, which is extensively employed in making paints and soft soaps. The oil belongs to the drying class. Poppy seed cake is rich in nitrogen and is highly valued as a cattle food.

As showing the enormous value of the output of oil-seeds and vegetable oils in India, a report on the progress of agriculture in that country for 1915-1916 shows that the Indian export trade in oil-seeds and vegetable oils is worth, annually, over £16,500,000 sterling. Only about one-third of the output is exported, and the remainder is used in the country. After the outbreak of the war the exports of oil-seeds have naturally declined. The oil-seeds that have been mostly attended to are ground nuts (peanut), sesame, and coconut. The area under ground nuts has increased from 431,000 acres in 1901-1904 to 2,413,000 acres in 1914-1915. From a small beginning in Burma in 1902 the crop now occupies 262,000 acres. The net profit per acre from its cultivation has been estimated at 47 rupees (about £4 6s.).

With regard to sesame, the Indian (Burma) crop covers something like 1,000,000 acres anually.

The importance of the coconut palm tree in South India may be gauged from the fact that the value of exports of its various products during 1914-1915 amounted to over £1,500,000 sterling.

---

## A NEW INDUSTRY IN PAPUA—MANGROVE BARK.

It looks (says "The Papuan Courier") as if there is every possibility of this becoming a great industry, and the pioneer of the trade, Mr. Butterworth, is now shipping large quantities of the bark to Australia, and various other small companies and syndicates have been formed.

The mangrove tree might be termed a land builder, as it collects and binds the soil in swamps and shallows, and in course of time large areas are in this way reclaimed.

The settlers employed in this industry should receive every assistance from the Government as regards concessions and reduced rates from the coastal and ocean shipping companies.

An industry which has for its object the extraction of chemicals from mangrove bark for the purposes of tanning is about to be started in Papua.

Mr. Ross, the representative of a Melbourne company, after three or four visits to Papua, has finally decided to recommend his company to commence operations.

Accompanied by Mr. G. Lincolne (of the firm of Messrs. Lincolne, MacDougall, and Demaine, civil and consulting engineers, of Melbourne), various sites have been inspected, and Kerema has been settled on as the place most suitable for the company's requirements. Other localities are in view to extend their operations once a start has been made. Permission has been granted by the Federal Treasurer to allow of the company to operate, and a sum of at least £20,000 is to be expended in the purchase and erection of a plant. Of course, some little time must elapse to enable the necessary machinery to be built and erected.

Both Mr. Ross and Mr. Lincolne stated, in an interview with our representative, that they were confident of the ultimate success of the enterprise, and that a great future exists for their operations. A chemist had been experimenting with the mangrove bark with the object of eliminating all dangerous chemicals therefrom.

We have no doubt all possible assistance will be granted by the Government towards facilitating matters for the new company.

Incidentally, Mr. Ross made inquiries in the direction of erecting a pulp mill for the manufacture of paper, but negotiations in that direction are at present in abeyance. In view of the present high cost of paper in Australia, and consequently in Papua, a movement in the direction of making paper here, with its huge timber resources, and the large amount of waste products inseparable from timber-getting, must recommend itself to all and sundry. A great deal of the business of the community is at any time likely to be hung up, owing to the insufficiency of paper supplies, and until the termination of the great European conflict no improvement in conditions can be looked for.

# EXHIBITION NOTES, 1917.

## THE EXHIBITS OF THE DEPARTMENT OF AGRICULTURE AND STOCK AT THE EXHIBITION OF THE QUEENSLAND NATIONAL ASSOCIATION, AUGUST, 1917.

Since the inception of the Queensland National Agricultural Association, forty odd years ago, there has been constant progress, despite initial difficulties, droughts, and eventually the destruction by fire of the first Exhibition Building at Bowen Park in June, 1888. It might have been and probably was anticipated that, owing to the increased exigencies of the war, necessitating special taxation, to the frequent disturbance of both rural and urban industries, consequent upon the many industrial strikes, and latterly to a long spell of dry weather, the prospects of a successful Exhibition in August, 1917, would not be very bright. Yet the very reverse has happened. That Exhibition was such a wonderful success, excelling all previous efforts in its results, that a casual visitor, unacquainted with the recuperative powers of the agricultural and pastoral industries of the State, might be excused for his belief that Queensland had been revelling in splendid seasons, and, consequently, in unreduced productions of nature and art, and it was, at the outset, generally conceded that the Exhibition of 1917 would prove a shining light in the history of the forty-two Exhibitions of the National Association. Nor were these anticipations destined to be erroneous. On the first day, before the official opening, the attendance numbered 6,000, the receipts being £72 7s. Only twice was this exceeded, and singularly enough, once, in point of numbers, during the great strike of 1912, when the record was 7,000 on the first day, representing receipts amounting to £87 13s., and the second time in 1914, in cash receipts from 4,800 visitors amounting to £88 2s. 6d.

The value of the work of the Association consists not merely in the amount of money taken at the gates and otherwise, but in its effects in bringing together people from all parts of the Commonwealth, as well as many from oversea, thus advertising far and wide the great resources, animal, mineral, vegetable, and industrial, of this, the most resourceful of all the States of Australia. The general public is naturally unaware of the great volume of business transacted during and after the Show, as a direct consequence of the advantages offered to business men, and to buyers and sellers generally, by personal inspection of the exhibits and personal communication with sellers and agents.

The limits of this Journal will not admit of our giving an exhaustive description of the multifarious exhibits and awards in this connection. That we must perforce leave almost entirely to the enterprise of the metropolitan and rural journals, confining ourselves to special salient points.

A word may here be appropriately added as to the onerous duties of secretary of the Association, which has from its inception been fortunate in the choice of its "first lieutenants." On the decease of the

late Mr. Arvier, to whom the success attending many previous shows was due, the present secretary, Mr. J. Bain, has given ample evidence of his good organising ability, and he has carried on the good work since 1915 with an energy and enthusiasm which must be instrumental in building further success upon the solid foundation which he and his predecessors have laid. The position of secretary to an important Association such as this one, demands much tact and firmness, especially at Show time.

## EXHIBITS OF THE DEPARTMENT OF AGRICULTURE AND STOCK.

Amongst the best arranged agricultural courts at the Exhibition this year, the display made by the Department of Agriculture and Stock undoubtedly takes a foremost place, and much is there to convince the stranger that Queensland is a most desirable State to select for a home. In this section, as also in those of the district sections, may be seen practical proofs of the extraordinary resources of the country, as well in climate, rainfall, and soil as in the vast areas of agricultural and pastoral land open to selectors. As far as rainfall is concerned, it must be confessed that occasionally severe droughts occur, and, as a matter of fact, for the four months preceding the Exhibition of 1917, very little rain fell in the Southern and Western districts, but to judge by the splendid exhibits of agricultural produce of all kinds, of cattle, horses, sheep, &c., this dry period had no generally bad effect on production.

Taken as a whole, the exhibits were so arranged as to bring before the public a number of individual sections, representing a part of the Department's activities, these being classed in such a way as to afford as much information as possible, and, at the same time, being of a highly educational character. The Court, this year, was arranged in a different manner to that of 1916, and afforded far more space for visitors to move about freely and inspect the exhibits at leisure.

In a general way, the various sections were grouped under four main heads: Temperate, Tropical, Agricultural, and Pastoral.

The several divisions were made up by—

Tropical and sub-tropical products: Exhibits of sugar-cane, tobacco, cotton, &c.

Wool.

Entomology and Plant Pathology, comprising—Diseases of fruits and vegetables; Queensland butterflies, moths, and beetles; insects injurious to fruits and fruit trees; insectivorous insects of the various districts of the State.

Botanical exhibit, embracing the chief natural grasses of Queensland, a large collection of the weeds of Queensland, prickly-pear of various kinds, &c.

Wheat and wheat-milling exhibits, the former being drawn from several of the chief wheatgrowing districts, and from the wheatbreeding State Farm at Bungeworgorai, near Roma.

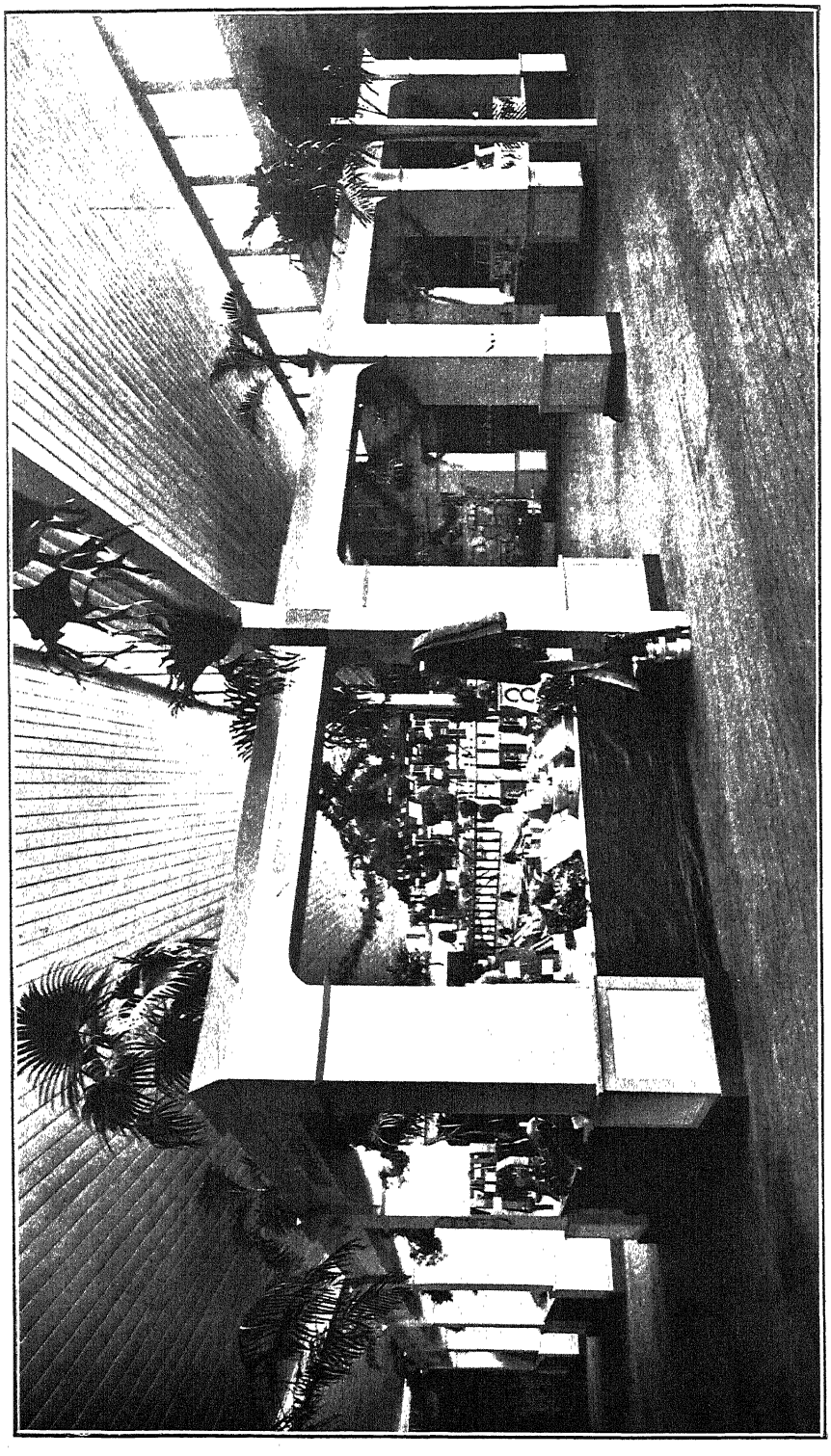


PLATE 9.—GENERAL VIEW OF THE COURT OF THE AGRICULTURAL DEPARTMENT FROM MAIN ENTRANCE.



PLATE 10.—VIEW OF THE CENTRAL TROPHY, DEPARTMENT OF AGRICULTURE AND STOCK.

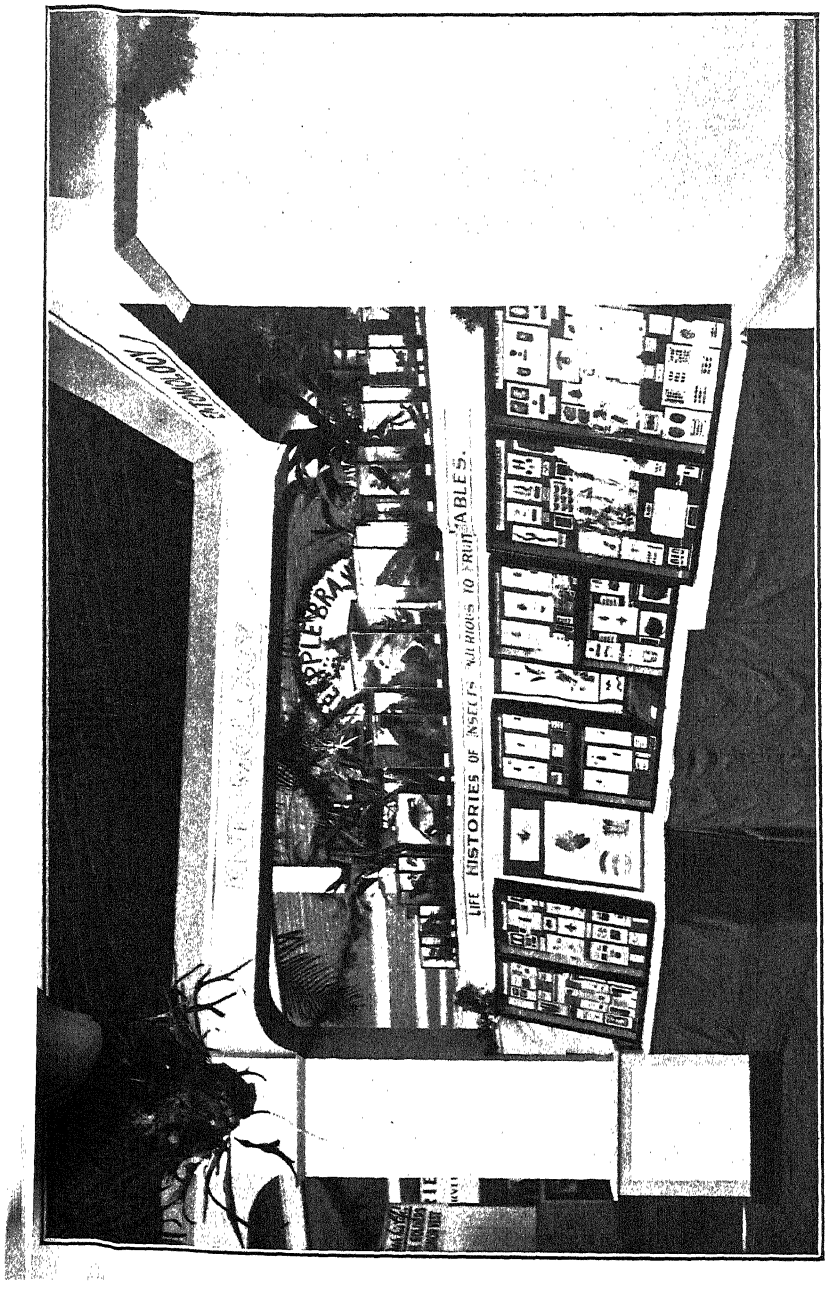



PLATE 11.—ENTOMOLOGICAL AND ORNITHOLOGICAL EXHIBITS, DEPARTMENT OF AGRICULTURE AND STOCK.

Maize exhibits, including sample cobs of maize grown by juvenile competitors in the 1916-17 maizegrowing competition, of which the results are given further on.

Bacteriological exhibit from the Stock Experiment Station at Yeerongpilly.

Division of dairying, fruit exhibits, broom and other millets, besides many other farm products, potatoes, hay, silage, vegetables, &c.

The Agricultural College at Gatton came well to the front with farm and dairy products, and such industrial work as saddlery, blacksmithing, and dairying was represented by excellent exhibits of cheese and butter, whilst many of the usual farm and garden products afforded evidence of the excellent work of the instructors.

## WOOL.

The wool exhibits comprised—Merino ewes' wool, Dorset Horn, Rams (black), Romney Marsh, Romney Marsh × Merino, Rams', pure-bred British breeds, half-bred. Wool grown on coastal areas, Border Leicester × Merino, Dorset × Merino, Lincoln × Merino, Lincoln. Wool grown at Elimbah, in the coastal area, Romney Marsh × Merino and Merino ewes, and Corriedales. This exhibit was a very fine one, and was collected and got up for the show by Mr. W. G. Brown, sheep and wool instructor, Department of Agriculture, who has devoted himself to the establishment of sheep-raising on the coastal lands with gratifying results.

A model is shown of a sheep spray, such as is successfully employed at Alice Downs Station, Blackall.

## SISAL FIBRE.

It may not be out of place to trace the history of sisal-planting back to its original source. Sisal "hemp," as the fibre is usually called, has to-day risen from about £24 per ton to £100 per ton for Java "A" quality, and from £90 to £95 per ton, ex store, according to quality. A few years ago, there was a considerable area planted with sisal in Queensland. The original plants were imported in 1890, and about a quarter-acre was planted at St. Helena Penal Establishment, where they throve remarkably well. Many thousands of young suckers were produced and were distributed gratis to intending growers in many coastal districts of the State. In time, scutching machinery was employed on the island, and splendid fibre was produced. A quantity was sent to the Panama Exposition in 1915, and it is gratifying to know that, in competition with many of the older sisal-growing countries of the world, the gold medal and the accompanying diploma were awarded to the Department of Agriculture and Stock for the best exhibit of sisal fibre at that great Show. These may be seen at the office of the Comptroller-General of Prisons. There are about 5 acres of the plants now in cultivation on the island. There are no longer any large sisal plantations in Queensland, mainly owing to, first, industrial troubles, and next, to the impossibility of shipping the fibre to Europe. What little fibre has been

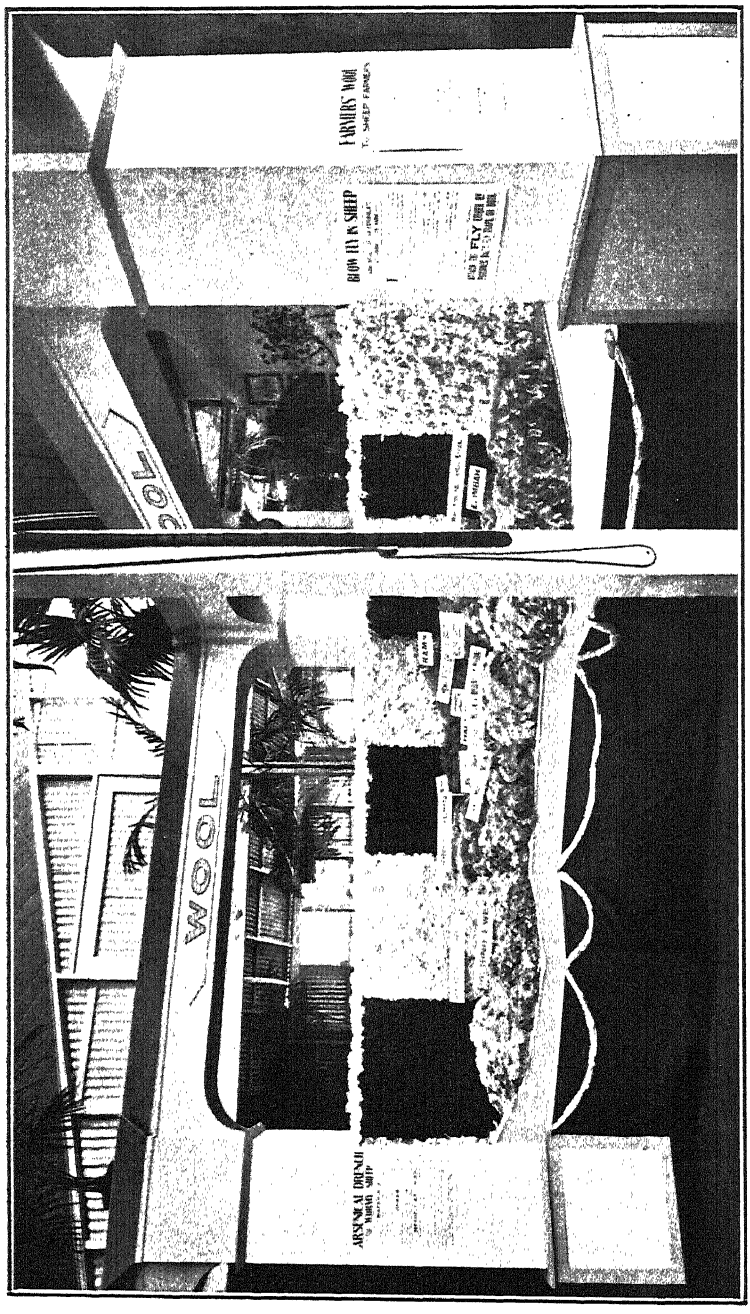



PLATE 12.—WOOL EXHIBIT, DEPARTMENT OF AGRICULTURE AND STOCK.

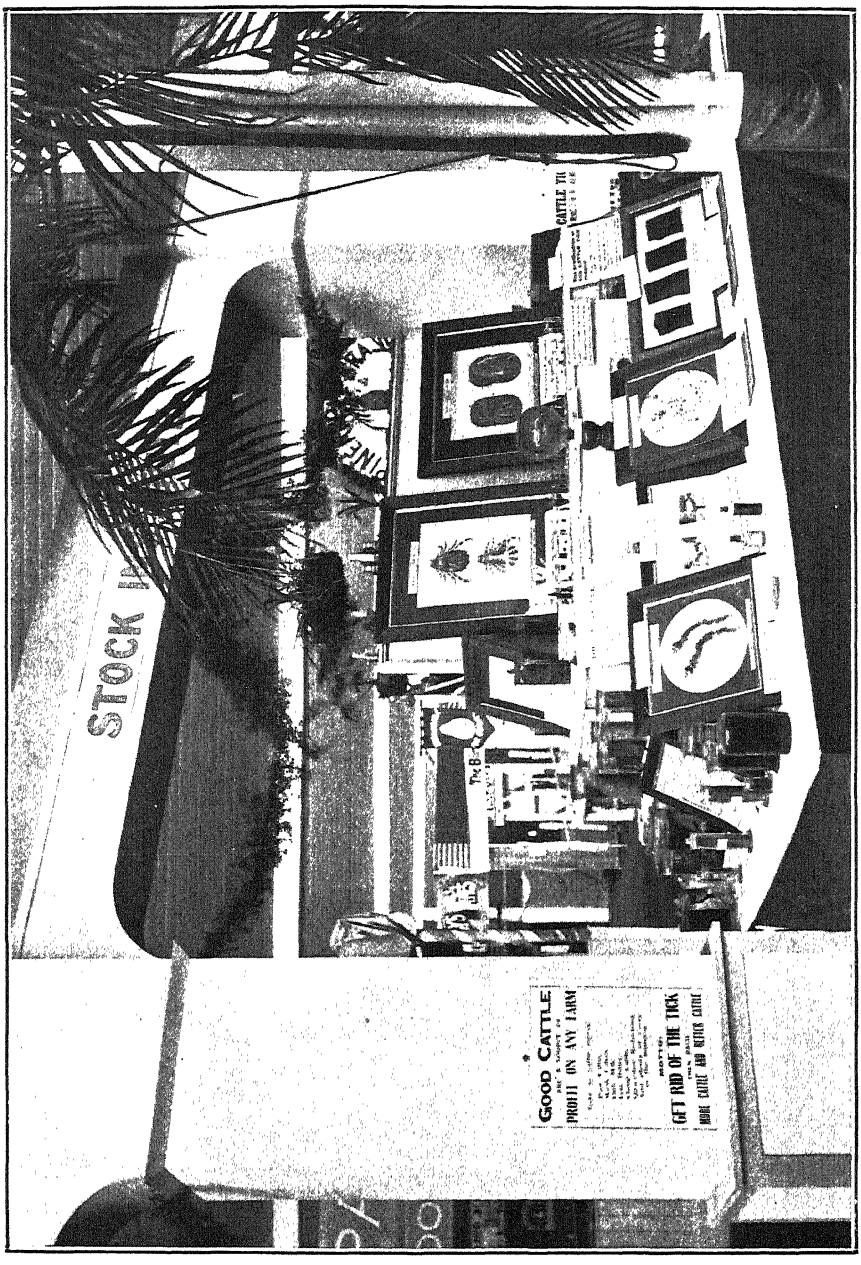



PLATE 13.—EXHIBIT OF THE STOCK INSTITUTE, YEERONGPILLY.

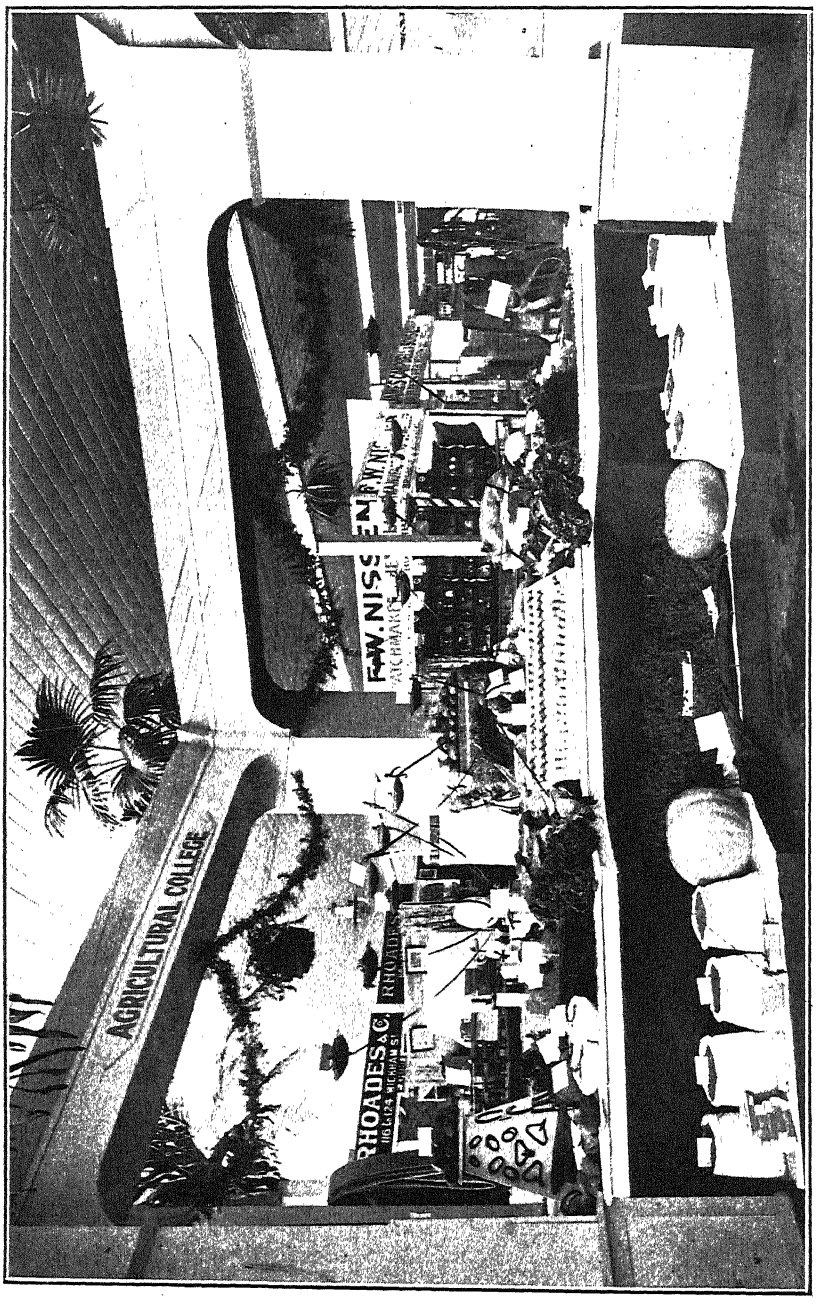



PLATE 14.—EXHIBIT OF PRODUCTS OF THE QUEENSLAND AGRICULTURAL COLLEGE.

produced latterly came from St. Helena and from two small plantations on the Northern Railway Line, near Gladstone. Both of these have now stopped work.

## PRUNING FRUIT TREES AND VINES.

Amongst the most valuable educationary exhibits was one, showing the various methods of pruning, by Mr. C. Ross, Instructor in Fruit Culture. Very frequently, fruitgrowers and viticulturists seek information on this important question of pruning from the Department. Here the whole system, as far as vine-pruning is concerned and the pruning of various fruit trees, was clearly demonstrated, and, in the matter of vines, the various methods adopted for different varieties of the grape vine are shown by growing vines only lately pruned.

## SUGAR-CANE AND SORGHUMS

of splendid quality were largely in evidence in most of the courts and in the exhibits of the Department of Agriculture, where all the latest and best varieties from the Experiment Station were on view. In spite of the dry weather at the commencement of the growing season, the cane generally made wonderful progress, so much so that it is expected that, notwithstanding labour troubles, the 1917 crop will pan out at about 400,000 tons of sugar. Some of the sorghums shown were of marvellous growth. One exhibit of Honduras giant sorghum showed a total height growth of quite 15 feet, if not more. Various other sorghums and millets were also on view.

## WEEDS AND NATIVE GRASSES.

In the Agricultural Department's section there was, as at last year's Show, a very instructive exhibit of the various pestiferous weeds which have spread from time to time throughout the State. These included several varieties of prickly-pear, which pest, if no means are found of controlling its activity, will cause even greater loss of our best pastoral and agricultural lands than the 1,000,000 acres per annum now stated to be a dead loss to the State. We have no space to give details of all the weeds illustrated and described by the Acting Government Botanist, Mr. C. T. White. One, however, demands the attention of all engaged in farming and dairying. This is the prostrate-growing khaki weed, which found its way to South America from South Africa, and eventually arrived in Australia.

As a set-off to these pests, most of our more valuable native fodder grasses continue to spread and provide excellent fodder for station stock.

## COTTON.

Both in the Departmental Court and in the District exhibits cotton held a prominent position, and it speaks well for the suitability of the soils and climates of far-sundered portions of the State that there were no inferior exhibits of this class of product. This season the State ginnery has already ginned and disposed of over 30,000 lb. of cotton, which was sold by tender at 11d. per lb., and, at the time of writing, farmers' cotton is still coming in to be ginned. We sincerely hope that farmers will realise the great value of a drought-resisting plant, which returns to the grower more net cash per acre than any other field crop.

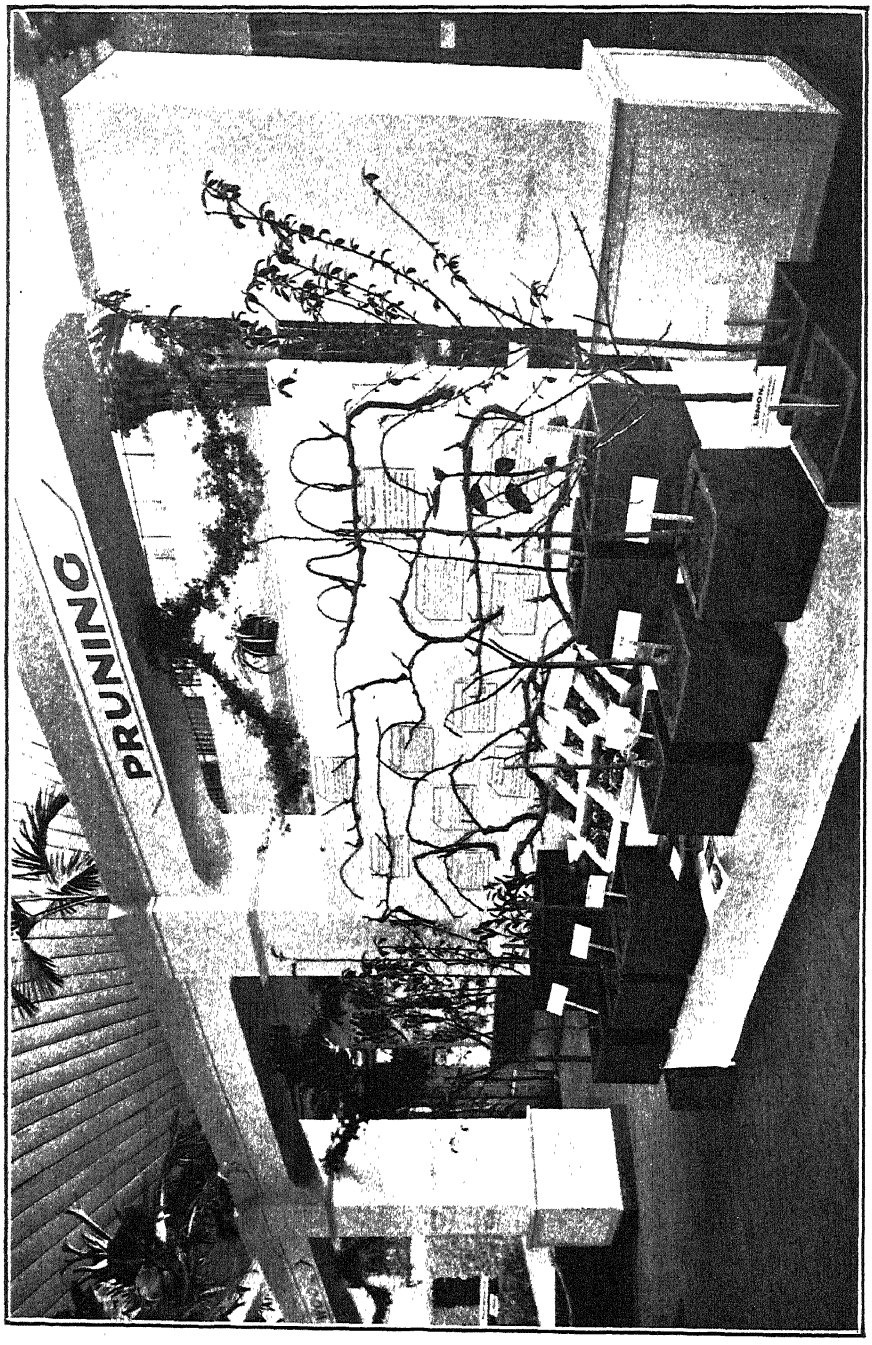



PLATE 15.—AN OBJECT LESSON IN PRUNING VINES AND FRUIT TREES.

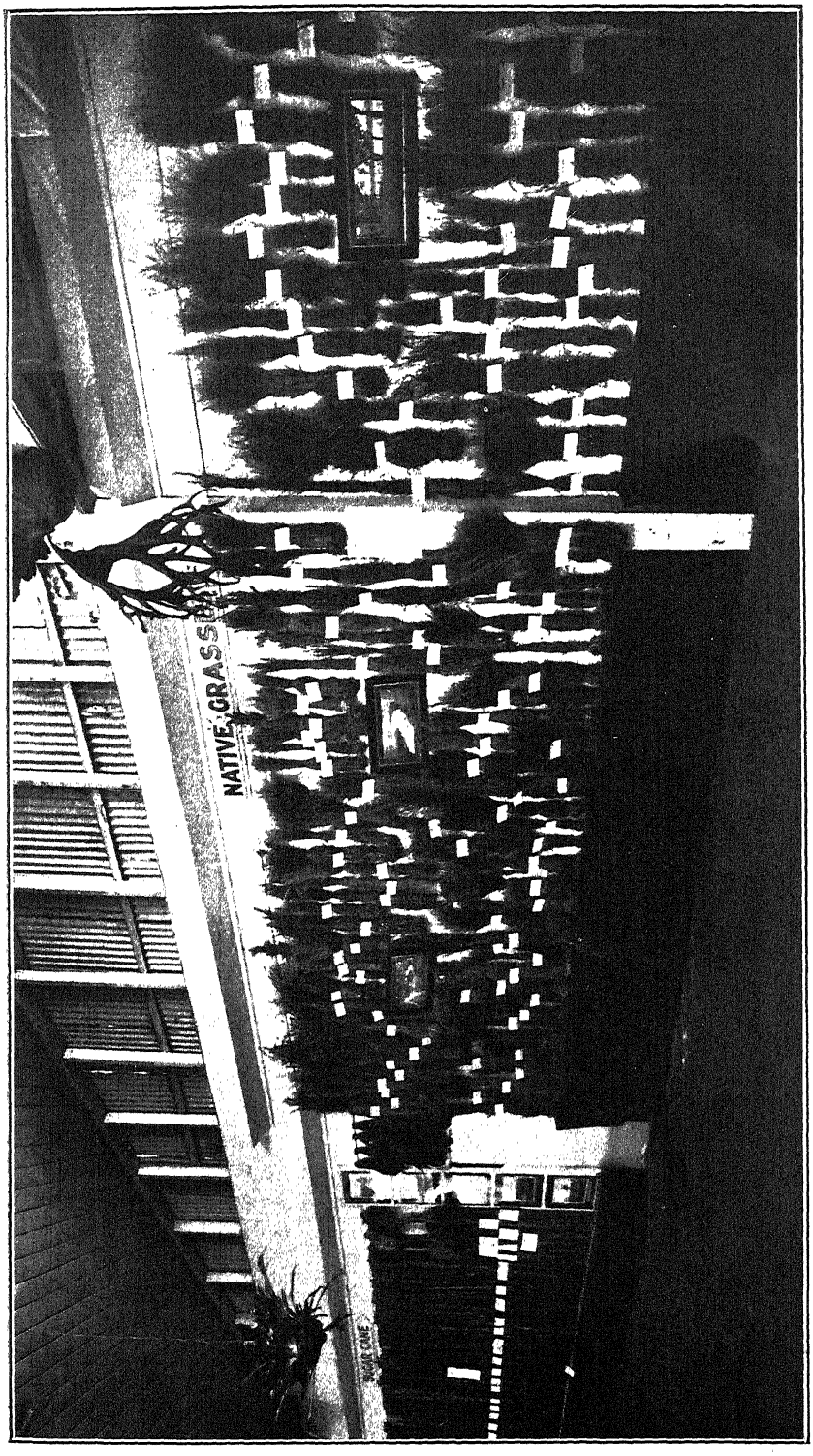



PLATE 16.—EXHIBIT OF SUGAR-CANE AND NATIVE GRASSES.

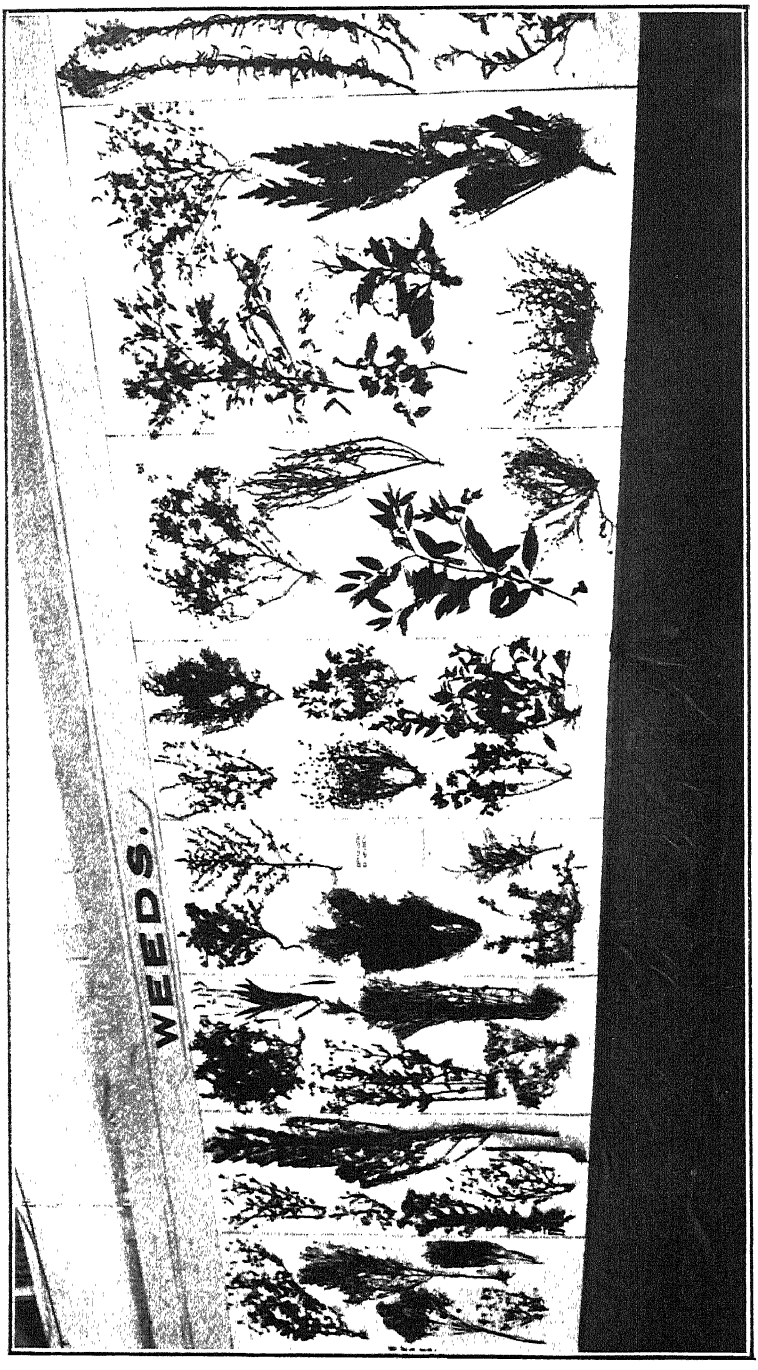



PLATE 17.—THE WEEDS OF QUEENSLAND. EXHIBIT OF THE BOTANICAL GARDENS, BRISBANE.

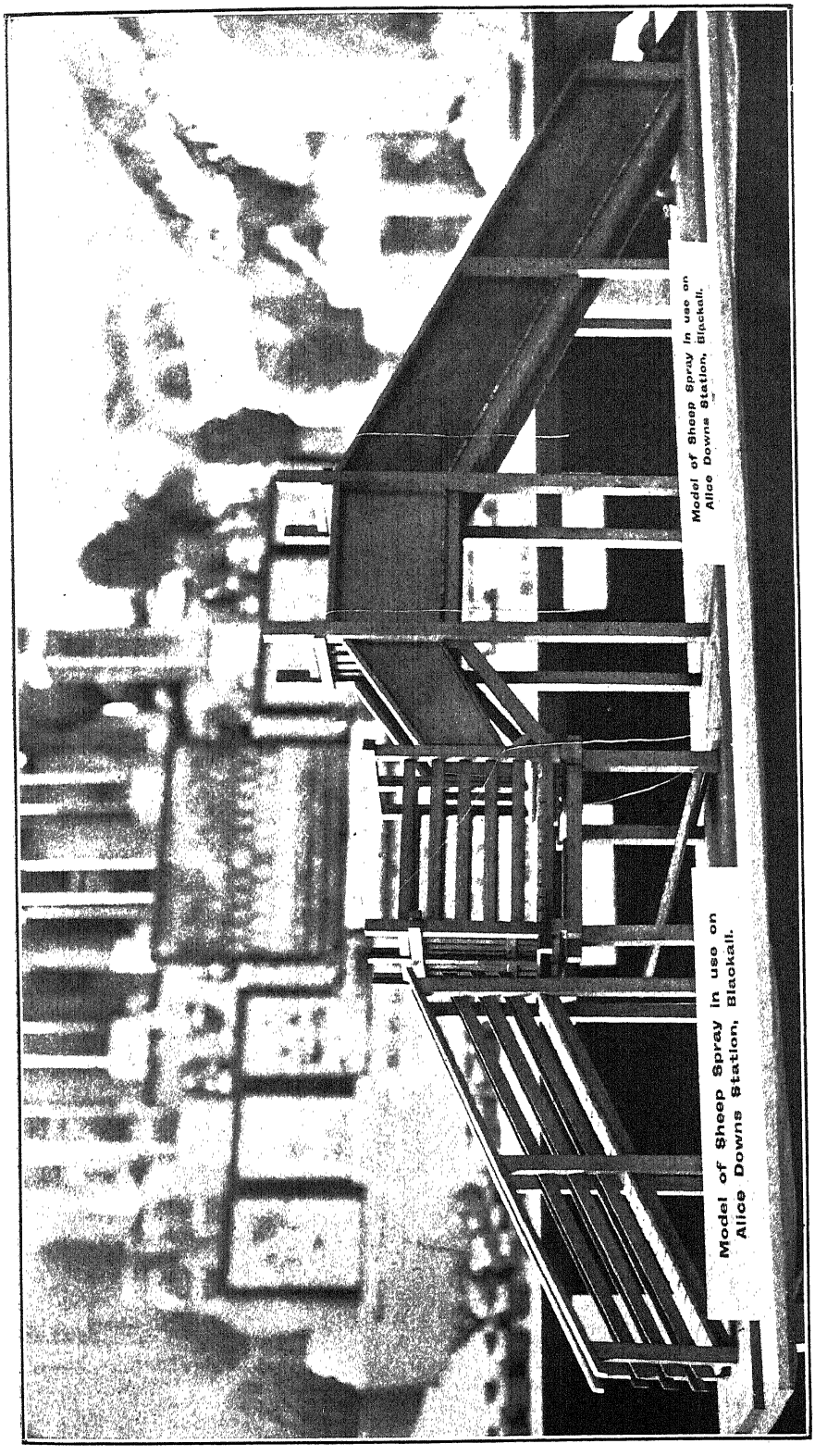



PLATE 18.—MODEL OF SHEEP SPRAY.

## JUVENILE CORN-GROWERS' COMPETITION, 1916-1917.

This annual competition is open to boys and girls under 18 years of age, who must be residents of Queensland, and must do all the work from preparing the land (one-tenth of an acre) to gathering the harvest. The Department of Agriculture and Stock supplies selected seed free of charge. The competition is much appreciated by the young farmers, and at National Association's Exhibition the results which are on view are examined with much interest by country visitors. The results of the 1916-1917 competition have now been made available. Eighty-seven young people entered for the contest. Some of the results were very good: one grower produced at the rate 107·8 bushels per acre, and five others reached or exceeded 100 bushels per acre, notwithstanding unfavourable weather conditions, first by excessive rain, later on by dry weather, and next by the depredations of mice, whose attacks reduced some of the averages by 30 to 40 per cent., and caused some of the competitors to withdraw from the competition.

Following is the list of awards:—

No. 1 DISTRICT.

| Name and Address of Competitor. | Age. | Yield per Acre. (Standard, 125 bushels). Maximum Points, 75. | | Quality of Grain and Uniformity of Ear. Maximum points, 15. | Records. Field Data, 10 points. | Totals. Maximum points, 100. | District Prize. |
|---|---|---|---|---|---|---|---|
| A. C. Marshall, Alberton, *via* Yatala | 13½ | 76·1 | 45·6 | 9 | 6 | 60·6 | 1st, £5 |
| R. G. Morrison, Purga, *via* Ipswich | 14 | 75·1 | 45·0 | 9·5 | 4·5 | 59·0 | 2nd, £2 |
| W. E. Patterson, Glamorgan Vale, *via* Walloon | 13 | 66·5 | 39·9 | 12 | 4 | 55·9 | 3rd, £1 |
| A. R. Pegg, Warril Bank, Harrisville | 16 | 59·8 | 35·8 | 11 | 3·5 | 50·3 | .. |
| A. V. Rachow, Alberton, *via* Yatala | 14½ | 58·5 | 35·1 | 9 | 5 | 49·1 | .. |
| W. O. Griffiths, Mount Forbes, *via* Rosewood | 14 | 48·8 | 29·2 | 8·5 | 9 | 46·7 | .. |
| John Osborne, Mt. Alford, *via* Boonah | 12 | 57·6 | 34·5 | 6 | 4·5 | 45·0 | .. |
| E. P. H. Prenzler, Kulgun, *via* Ipswich | 15 | 45·1 | 27·0 | 8 | 4 | 39·0 | .. |
| Gordon Osborne, Mt. Alford, *via* Boonah | 15 | 44·4 | 26·6 | 8 | 2·5 | 37·1 | .. |
| A. G. Marks, Alberton, *via* Yatala | 14½ | 35·4 | 21·2 | 8·5 | 5·5 | 35·2 | .. |
| D. S. Loudon, Ebenezer, *via* Rosewood | 11½ | 13·6 | 8·1 | 5 | 2 | 15·1 | .. |

No. 2 DISTRICT.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| N. H. McGinn, Oakey Creek, *via* Eumundi | 17 | 105·7 | 63·4 | 10 | 9·5 | 82·9 | 1st, £5 |
| E. A. Sims, Gheerulla, *via* Eumundi | 11¾ | 101·0 | 60·6 | 11·5 | 6 | 78·1 | 2nd, £2 |
| W. J. Guldbransen, Samford .. | 15 | 104·1 | 62·4 | 10 | 4 | 76·4 | 3rd, £1 |
| J. S. Bray, Lawnton, N.C. Line | 14 | 90·3 | 54·1 | 11 | 5·5 | 70·6 | .. |
| A. F. G. Pedwell, Samford .. | 18 | 78·3 | 46·9 | 12 | 5 | 63·9 | .. |
| W. P. Pedwell, Samford .. | 13 | 75·7 | 45·4 | 9 | 5 | 59·4 | .. |
| V. R. Ellis, Tuchekoi, *via* Cooran | 13¾ | 60·3 | 36·1 | 9 | 5 | 50·1 | .. |
| F. B. Leembruggen, Samford .. | 17½ | 38·9 | 23·3 | 8 | 8 | 39·3 | .. |

N. H. McGinn also secured a Special Prize (the second), value £5.

No. 3 DISTRICT.

| Name and Address of Competitor. | Age. | Yield per Acre. (Standard, 125 bushels). Maximum Points, 75. | | Quality of Grain and Uniformity of Bar. Maximum points, 15 | Records. Field Data, 10 points | Totals, Maximum points, 100. | District Prize. |
|---|---|---|---|---|---|---|---|
| T. A. Smoothy, Pinelands, Crow's Nest | 13 | 107·8 | 64·6 | 11·5 | 9 | 85·1 | 1st, £5 |
| V. Littleton, Pinelands, Crow's Nest | 14¾ | 95·6 | 57·3 | 9 | 6 | 72·3 | 2nd, £2 |
| G. Jamusch, Haden, *via* Toowoomba | 16 | 84·8 | 50·8 | 9 | 3 | 62·8 | 3rd, £1 |

T. A. Smoothy also secured a Special Prize (the first), value £10.

No. 4 DISTRICT.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| S. L. Marshall, Wooroolin .. | 13¾ | 99·5 | 59·7 | 10 | 4 | 73·7 | 1st, £5 |
| G. Maynard, Taabinga, *via* Kingaroy | 13½ | 73·9 | 44·3 | 8 | 4 | 56·3 | 2nd, £2 |
| L. J. Horne, Goomeri .. .. | 15 | 61·3 | 36·7 | 11 | 5 | 52·7 | 3rd, £1 |
| J. MacKenzie, Home Creek, *via* Tingoora | 15 | 56·3 | 33·7 | 9 | 5·5 | 48·2 | .. |
| A. C. Ellwood, Memerambi .. | 17 | 51·1 | 30·6 | 10 | 4 | 44·6 | |
| W. C. Hansen, Wondai .. | 13 | 49 | 29·4 | 9·5 | 4 | 42·9 | .. |

No. 5 DISTRICT.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A. Wilkie, Killarney .. .. | 14 | 96 | 57·6 | 9·5 | 3 | 70·1 | 1st, £5 |
| H. Gow, Killarney .. .. | 15 | 80·1 | 48·0 | 7·5 | 10 | 65·5 | 2nd, £2 |
| Rachel Gow, Killarney .. | 10 | 75·5 | 45·3 | 8 | 5 | 58·3 | 3rd, £1 |
| C. Thies, Highfields, Toowoomba | 13½ | 69·5 | 41·8 | 10 | 5 | 56·8 | .. |
| R. F. Watson, Summit, S. Line | 15½ | 60·1 | 36·0 | 7 | 4·5 | 47·5 | .. |
| P. Madden, Killarney .. | 13 | 48·7 | 29·2 | 8·5 | 6 | 43·7 | .. |
| A. T. Henderson, Summit, S. Line | 17½ | 37·2 | 22·3 | 7 | 6 | 35·3 | .. |

No. 6 DISTRICT.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| F. H. C. Lieberam, Gurgeena, Gayndah | 15 | 106·9 | 64·1 | 11 | 6 | 81·1 | 1st, £5 |

This Competitor also secured a Special Prize (the third), value £3; (no other competitors in district class).

No. 7 DISTRICT.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| G. H. Kirstenfeldt, Rosalie Plns. | 12¼ | 56·9 | 34·1 | 7 | 2·5 | 43·6 | 1st, £5 |
| D. J. Allen, Pelican, *via* Chinchilla | 15 | 17·7 | 10·6 | 8 | 2·5 | 21·1 | 2nd, £2 |

No third prize awarded owing to lack of competition.

No. 8 DISTRICT.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| H. M. McCamley, Bajool .. | 17 | 104·8 | 62·8 | 8·5 | 3 | 74·3 | 1st, £5 |
| C. E. McCamley, Bajool .. | 15 | 99·3 | 59·5 | 9 | 3 | 71·5 | 2nd, £2 |
| B. Philp, Bracewell, Mt. Larcom | 15¾ | 78·2 | 46·9 | 11 | 3·5 | 61·4 | 3rd, £1 |
| Mary Wilson, Mt. Rae, Yeppoon | 15½ | 66·5 | 39·9 | 9·5 | 5·5 | 54·9 | .. |
| A. E. Nitz, Barmoya Settlement | 14 | 58·9 | 35·3 | 10 | 3 | 48·3 | .. |

No. 9 DISTRICT.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Keith Downs, Tarzali, *via* Malanda | 12¾ | 97·5 | 58·5 | 9 | 4·5 | 72 | 1st, £5 |

No second and third prizes awarded owing to lack of competition.

## DYES AND PAPERS FROM NATIVE PLANTS.

A most interesting and, under present war conditions, important exhibit was one by Mr. J. Campbell, of Cairns, in which the manufacture of paper from various fibrous plants indigenous to Queensland was practically described by the exhibition of the plant, of its fibre, and of the several processes the material underwent to produce the fine samples of good, tough, brown packing-paper. Also there was shown how a highly important industry could easily be established in the manufacture of dyes of various hues, even black (a difficult dye to produce). These dyes have all the characteristics of the aniline dyes, so largely imported from Germany previous to the war. Mr. Campbell has clearly shown that we need not be dependent on importation of these products, since it is quite possible to produce them in our own State.

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## THE DISTRICT EXHIBITS.

Last year, much additional interest attached to the competition in this class, owing to the fact that the Queensland Districts were challenged in A Grade by the Western Districts of New South Wales, which included such centres of population as Lithgow, Paramatta, Orange, Mudgee, Bathurst, Dubbo, and Penrith, when the prize was awarded to New South Wales, whose score was 874 points out of a possible 1,390. The only Queensland competitor (Queensland South Coast District) made such a creditable display as to come in only 22 points behind the winner.

This year there were three exhibits in the "A" Grade, the competitors being the Darling Downs, Wide Bay and Burnett, and the South Coast. It is fifteen years since Darling Downs competed in this section, and seven years have elapsed since the reappearance of the Wide Bay and Burnett District. In "B" Grade, four districts—Crow's Nest, Fassifern, Wallumbilla, and Gympie—competed.

In the "A" Grade, Darling Downs was successful with 1,037 points, Wide Bay scoring 904, and South Coast 800.

In "B" Grade, Crow's Nest won with 884 points. Fassifern took second honours with 856; Gympie, 785. Wallumbilla scored 661 points.

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## DISTRICT EXHIBITS OF FRUITS.

The competition for the district exhibits of fruit created considerable interest. There were four competitors—Buderim Mountain District, Caboolture District (including Woodford, Glasshouse Mountain to Landsborough), Palmwoods, and the Gympie District (from Cooran-Tewantin road to Gundiah). The exhibits were very creditable, and a fine advertisement for the fertility of the soil of the districts mentioned. The judge was Mr. A. W. Carseldine. The first prize was awarded to Buderim Mountain District, with 111 points out of a possible 170. Landsborough North was placed second, with 109, and the Caboolture District, with 108, was a very close third. The Gympie District only did fairly well, but may do better in future with the experience gained in

the competition. In addition to the prize money, National certificates were awarded as follows:—Caboolture, for pineapples; Landsborough North and District, for citrus fruit; and Buderim Mountain District, for bananas. In grading and packing of fruits exhibited in cases and general display the honours were secured by Caboolture and Landsborough North, which each secured 22 points out of the possible 30. The details of the award are as follow, the possible points being shown in parenthesis:—

| | Points. | Buderim. | Landsborough. | Caboolture. | Gympie. |
|---|---|---|---|---|---|
| Bananas | 25 | 20 | 18 | 16 | 16 |
| Pineapples | 25 | 14 | 17 | 20 | 12 |
| Citrus fruits | 25 | 18 | 23 | 18 | 12 |
| Custard apples | 10 | 5 | 2 | 3 | .. |
| Papaws | 10 | 7 | 5 | 5 | 7 |
| Strawberries | 10 | 7 | 8 | 2 | 8 |
| All other fruits | 15 | 12 | 5 | 8 | 6 |
| Home-made preserved fruits, bottled, canned, or dried; or as home-made jam | 20 | 10 | 9 | 14 | 8 |
| Grading, packing, and general display | 30 | 18 | 22 | 22 | 12 |
| TOTALS | 170 | 111 | 109 | 108 | 81 |

## ONE-FARM EXHIBITS.

The competition in this section always evokes much interest amongst the farming community, and it is to be regretted that more farmers do not compete. Last year there were three entries—Mr. O. C. Williams, Plainby, Crow's Nest (who won the first prize in 1915); Mr. J. A. Nystrom, of Booie, Kingaroy; and Mr. W. Allan, of Gympie. Mr. O. C. Williams was again successful in winning the first prize in 1916, and this year he again comes out the winner, after a keen contest with Mr. Nystrom, who was only 62 points behind. The points scored were as follow:—

| | Possible. | Nystrom. | Williams. |
|---|---|---|---|
| DAIRY PRODUCE— | | | |
| Butter | 25 | 15 | 12 |
| Cheese | 20 | 20 | 14 |
| Eggs | 5 | 5 | 3 |
| | 50 | 40 | 29 |
| FOODS— | | | |
| Hams and bacon | 20 | 15 | 10 |
| Corned, smoked, and spiced beef and mutton | 10 | 5 | 8 |
| Honey | 10 | 5 | 8 |
| Beeswax | 5 | 2 | 3 |
| Bread and scones | 5 | 4 | 4 |
| Confectionery and sweets | 5 | 2 | 4 |
| Lard, tallow, oils | 5 | 3 | 4 |
| | 60 | 36 | 41 |

| —— | Possible. | Nystrom. | Williams. |
|---|---|---|---|
| FRUITS, VEGETABLES, AND ROOTS (fresh and preserved) | | | |
| Fresh fruits, all kinds | 25 | 16 | 10 |
| Dried fruits | 10 | 5 | 8 |
| Preserved fruits and jams | 15 | 7 | 12 |
| Fresh vegetables | 15 | 7 | 7 |
| Pickles, sauces, &c. | 15 | 8 | 12 |
| Potatoes and roots | 25 | 13 | 18 |
| Table pumpkins, squashes, and marrows | 10 | 5 | 7 |
| Cocoanuts and nuts | 3 | 2 | 1 |
| Vegetable and garden seeds | 5 | 2 | 4 |
| Arrowroot | 5 | 4 | 3 |
| Cassava | 5 | 12 | 12 |
| Ginger | 5 | 12 | 3 |
| Sugar beet | 5 | 3 | 3 |
| | 143 | 96 | 100 |
| GRAIN, &C.— | | | |
| Wheat | 25 | 10 | 18 |
| Maize | 20 | 12 | 18 |
| Barley | 10 | 6 | 8 |
| Oats, rye, and rice | 15 | 7 | 10 |
| | 70 | 35 | 54 |
| TROPICAL PRODUCTS— | | | |
| Sugar-cane | 30 | 15 | 10 |
| Cotton, *in seed* | 10 | 7 | 6 |
| Coffee | 15 | 12 | 5 |
| | 55 | 34 | 21 |
| TOBACCO, &C.— | | | |
| Tobacco, leaf, dried | 10 | 6 | 7 |
| HAY, CHAFF, ETC.— | | | |
| Hay, oaten, wheaten, lucerne, &c. | 20 | 8 | 18 |
| Grasses and their seeds | 10 | 6 | 6 |
| Chaff, oaten, wheaten, lucerne, &c. | 20 | 10 | 18 |
| Ensilage, any form | 15 | 8 | 8 |
| Cattle fodder (pumpkins and green fodder) | 15 | 8 | 8 |
| Sorghum and millet | 10 | 8 | 6 |
| Hemp | 5 | 3 | 3 |
| Flax | 5 | 3 | 3 |
| Cowpea seed | 7 | 6 | 4 |
| Broom millet | 10 | 6 | 6 |
| | 117 | 66 | 80 |
| WOOL— | | | |
| Greasy | 20 | 15 | 15 |
| Mohair | 5 | 4 | 4 |
| | 25 | 19 | 19 |
| DRINKS, ETC.— | | | |
| Temperance drinks | 10 | 4 | 5 |
| WOMEN'S AND CHILDREN'S WORK— | | | |
| Needlework, knitting, fine arts | 10 | 5 | 7 |
| School work—Maps, writing, &c. | 10 | 3 | 3 |
| Fancy work | 10 | 8 | 10 |
| | 30 | 16 | 20 |
| Miscellaneous articles of commercial value | 5 | 3 | 4 |
| Plants and flowers in pots | 5 | 2 | 4 |
| Time and labour saving useful articles made on the farm | 10 | 12 | 6 |
| Effective arrangement of exhibits | 10 | 7 | 9 |
| | 30 | 24 | 23 |
| TOTALS | 600 | 325 | 387 |

## BUTTER AWARDS.

The judging of the butter was completed on Tuesday, 14th August. The competitions were keen, but it is understood that generally the butter was not equal to the best that has been produced in Queensland. No doubt the adverse season has had a detrimental effect. The outstanding feature of the competitions has been the pronounced success of the Downs Co-operative Dairy Company's Toowoomba factory. This factory won the two first prizes in the unsalted classes. In export classes the company won first prize for eight weeks' storage, second prize for thirty days' storage, first prize for greatest aggregate in all classes, and first prize for box salted with Australian salt. The first prize for thirty days' storage was won by Dungog Co-operative Butter Company, Limited, Dungog (N.S.W.), who were placed second to the Downs in eight weeks' storage. The awards are as follow:—

ONE BOX, UNSALTED, FACTORY MADE.

| — | Flavour. | Texture. | Colour. | Salting. | Packing. | Total. |
|---|---|---|---|---|---|---|
| Possible points .. .. .. | 65 | 20 | 7 | 4 | 4 | 100 |
| Downs Co-operative Dairy Company, Toowoomba .. .. .. .. | 59½ | 19½ | 7 | 4 | 4 | 94 |
| Maleny Co-operative Dairy Company .. | 58 | 19½ | 7 | 4 | 4 | 92½ |
| Stanley River Co-operative Company, Woodford .. .. .. .. | 58½ | 19 | 7 | 4 | 3 | 91½ |
| Queensland Farmers' Co-operative Co.— | | | | | | |
| Booval .. .. .. .. .. | 57½ | 19 | 7 | 4 | 3½ | 91 |
| Boonah .. .. .. .. | 56½ | 19½ | 7 | 4 | 4 | 91 |
| Grantham .. .. .. .. | 57 | 19 | 7 | 4 | 4 | 91 |
| Laidley .. .. .. .. .. | 56½ | 19 | 7 | 4 | 4 | 90½ |
| Caboolture Co-operative Dairy Company | 57 | 19 | 7 | 4 | 3½ | 90½ |
| A. L. Frederich, Townshend .. .. | 58 | 19 | 7 | 4 | 2½ | 90½ |
| Silverwood, Gatton .. .. .. | 57 | 19½ | 6½ | 4 | 3½ | 90½ |
| Maryborough Co-operative Dairy Co.— | | | | | | |
| Kingaroy .. .. .. .. | 56½ | 19 | 7 | 4 | 3½ | 90 |
| Biggenden .. .. .. .. | 56½ | 19½ | 7 | 4 | 3 | 90 |
| Mundubbera .. .. .. .. | 56 | 18½ | 7 | 4 | 2½ | 88 |
| Maryborough .. .. .. .. | 53½ | 19½ | 7 | 4 | 3½ | 87½ |
| Maclagan Valley Co-operative Dairy Co... | 56 | 19 | 7 | 4 | 3½ | 89½ |
| Kin Kin Co-operative Dairy Company .. | 56½ | 19 | 7 | 4 | 3 | 89½ |
| South Burnett Co-operative Dairy Co.. Murgon .. .. .. .. | 56½ | 19½ | 7 | 4 | 2½ | 89½ |
| Wide Bay Co-operative Dairy Company, Cooroy .. .. .. .. .. | 55 | 19 | 7 | 4 | 4 | 89 |
| Logan and Albert Co-operative Dairy Co., Beaudesert .. .. .. .. | 55 | 19 | 7 | 4 | 4 | 89 |
| Singleton (N.S.W.) Central Co-operative Dairy Company .. .. .. | 55 | 19 | 7 | 4 | 4 | 89 |
| Queensland Agricultural College, Gatton | 55 | 19½ | 6½ | 4 | 3 | 88 |
| Terror's Creek and Samson Vale Co-operative Dairy Company .. .. | 55 | 18½ | 7 | 4 | 3 | 87½ |
| Goombungee Co-operative Dairy Company | 53½ | 19 | 7 | 4 | 4 | 87½ |
| Warwick Dairying Company— | | | | | | |
| Allora .. .. .. .. .. | 55 | 18½ | 6½ | 4 | 3½ | 87½ |
| Texas .. .. .. .. .. | 53 | 19 | 7 | 4 | 4 | 87 |
| Millhill .. .. .. .. .. | 55 | 18 | 7 | 4 | 3 | 87 |
| Oakey Co-operative Dairy Company .. | 52 | 19½ | 7 | 4 | 4 | 86½ |

ONE BOX FRESH, FACTORY MADE.

| — | Flavour. | Texture. | Colour. | Salting. | Packing. | Total. |
|---|---|---|---|---|---|---|
| Possible points .. .. .. | 65 | 20 | 7 | 4 | 4 | 100 |
| Downs Co-operative Dairy Company, Toowoomba .. .. .. .. | 60 | 19½ | 7 | 4 | 4 | 94½ |
| Wide Bay Co-operative Dairy Company, Cooroy .. .. .. .. .. | 59 | 19 | 6½ | 4 | 4 | 92½ |
| Queensland Farmers' Co-operative Co.— | | | | | | |
| Booval .. .. .. .. .. | 58 | 19 | 7 | 4 | 4 | 92 |
| Laidley .. .. .. .. .. | 57½ | 19 | 7 | 4 | 4 | 91½ |
| Boonah .. .. .. .. | 57 | 19½ | 7 | 3½ | 4 | 91 |
| Grantham .. .. .. .. | 55 | 19 | 7 | 4 | 4 | 89 |
| Maleny Co-operative Dairy Company .. | 57½ | 19 | 7 | 4 | 4 | 91½ |
| Stanley River Co-operative Dairy Co., Woodford .. .. .. .. | 57 | 19 | 7 | 4 | 3 | 90 |
| A. L. Frederich, Townshend .. .. | 57½ | 19 | 7 | 4 | 2½ | 90 |
| Maclagan Valley Co-operative Dairy Co. | 56½ | 19 | 7 | 3½ | 3 | 89 |
| Silverwood, Gatton .. .. .. | 54½ | 19½ | 7 | 4 | 3½ | 88½ |
| Goombungee Co-operative Dairy Company | 54 | 19½ | 7 | 4 | 4 | 88½ |
| Caboolture Co-operative Dairy Company | 55 | 19 | 7 | 4 | 3½ | 88½ |
| Maryborough Co-operative Dairy Co.— | | | | | | |
| Maryborough .. .. .. .. | 55 | 19 | 7 | 4 | 3½ | 88½ |
| Kingaroy .. .. .. .. | 56 | 19 | 7 | 3 | 3½ | 88½ |
| Mundubbera .. .. .. .. | 56 | 19 | 6½ | 4 | 3 | 88½ |
| Biggenden .. .. .. .. | 53½ | 19 | 6 | 4 | 3½ | 86 |
| Warwick Dairying Company— | | | | | | |
| Texas .. .. .. .. .. | 53½ | 19½ | 7 | 4 | 4 | 88 |
| Millhill .. .. .. .. .. | 56 | 18 | 7 | 4 | 3 | 88 |
| Allora .. .. .. .. .. | 55 | 18½ | 6½ | 4 | 3½ | 87½ |
| Logan and Albert Co-operative Dairy Co., Beaudesert .. .. .. .. | 54 | 19 | 7 | 4 | 4 | 88 |
| Singleton (N.S.W.) Central Co-operative Dairy Company .. .. .. | 54 | 19½ | 6½ | 4 | 4 | 88 |
| Kin Kin Co-operative Dairy Company .. | 55 | 19 | 7 | 3½ | 3 | 87½ |
| Queensland Agricultural College, Gatton | 54½ | 19½ | 6½ | 4 | 3 | 87½ |
| Oakey Co-operative Dairy Company .. | 53 | 19 | 7 | 4 | 4 | 87 |
| South Burnett Co-operative Dairy Co., Murgon .. .. .. .. | 55 | 19 | 6 | 4 | 2½ | 86½ |
| Terror's Creek and Samson Vale Co-operative Dairy Company .. .. | 54 | 18 | 7 | 3 | 2½ | 84½ |

EXPORT BUTTER—ONE BOX, THIRTY DAYS' STORAGE.

| | | | | | | |
|---|---|---|---|---|---|---|
| Dungog (N.S.W.) Co-operative Dairy Co. | 61 | 20 | 7 | 4 | 4 | 96 |
| Downs Co-operative Dairy Company, Toowoomba .. .. .. .. | 61 | 19½ | 7 | 4 | 4 | 95½ |
| Singleton (N.S.W.) Central Co-operative Dairy Company .. .. .. | 60 | 19½ | 7 | 4 | 4 | 94½ |
| Goombungee Co-operative Dairy Company | 57 | 19½ | 7 | 4 | 4 | 91½ |
| Queensland Farmers' Co-operative Co.— | | | | | | |
| Grantham .. .. .. .. | 57 | 19 | 7 | 4 | 4 | 91 |
| Laidley .. .. .. .. .. | 57 | 19 | 7 | 4 | 4 | 91 |
| Booval .. .. .. .. .. | 56 | 19 | 6½ | 4 | 4 | 89½ |
| Boonah .. .. .. .. | 55½ | 19 | 6½ | 4 | 4 | 89 |
| Maleny Co-operative Dairy Company .. | 66 | 19½ | 7 | 4 | 4 | 90½ |
| Silverwood, Gatton .. .. .. | 57 | 19 | 6½ | 4 | 4 | 90½ |
| Logan and Albert Co-operative Dairy Company, Beaudesert .. .. .. | 57 | 18½ | 6½ | 4 | 4 | 90 |
| Warwick Dairying Company— | | | | | | |
| Texas .. .. .. .. .. | 56 | 19 | 6½ | 4 | 4 | 89½ |
| Allora .. .. .. .. .. | 56½ | 19½ | 6 | 4 | 3½ | 89½ |
| Millhill .. .. .. .. .. | 56½ | 19 | 6½ | 4 | 3½ | 89½ |
| Gayndah Co-operative Dairy Company .. | 54½ | 19½ | 7 | 4 | 4 | 89 |
| Downs Co-operative Dairy Company, Clifton .. .. .. .. .. | 55 | 19½ | 6½ | 4 | 3½ | 88½ |

EXPORT BUTTER—ONE BOX, THIRTY DAYS' STORAGE—*continued.*

| — | Flavour. | Texture. | Colour. | Salting. | Packing. | Total. |
|---|---|---|---|---|---|---|
| Possible points .. .. .. | 65 | 20 | 7 | 4 | 4 | 100 |
| Caboolture Co-operative Dairy Company | 54½ | 19 | 7 | 4 | 3½ | 88 |
| Queensland Agricultural College, Gatton | 54½ | 19½ | 6½ | 4 | 3½ | 88 |
| South Burnett Co-operative Dairy Company, Murgon .. .. .. .. | 55 | 19 | 7 | 3½ | 3 | 87½ |
| Maryborough Co-operative Dairy Co.— | | | | | | |
| Kingaroy .. .. .. .. | 55 | 18½ | 7 | 3½ | 3½ | 87½ |
| Mundubbera .. .. .. .. | 53½ | 18½ | 6½ | 3½ | 3½ | 85½ |
| Biggenden .. .. .. .. | 53½ | 18 | 6 | 3 | 3½ | 84 |
| Maclagan Valley Co-operative Dairy Company .. .. .. .. .. | 54 | 18½ | 7 | 4 | 3½ | 87 |
| Oakey Co-operative Dairy Company .. | 54 | 18½ | 6½ | 4 | 4 | 87 |
| A. L. Frederich, Townshend .. .. | 55 | 18½ | 6½ | 4 | 3 | 87 |
| Wide Bay Co-operative Dairy Company, Cooroy .. .. .. .. .. | 54½ | 18 | 6 | 4 | 4 | 86½ |
| Terror's Creek and Samson Vale Co-operative Dairy Company .. .. | 54 | 18½ | 5½ | 4 | 4 | 86 |
| Stanley River Co-operative Dairy Company, Woodford .. .. .. | 53½ | 18½ | 6½ | 4 | 3½ | 86 |
| Kin Kin Co-operative Dairy Company .. | 53 | 18 | 6 | 4 | 3½ | 84½ |
| Roma Co-operative Dairy Company .. | 55 | 19 | 6½ | .. | 3½ | 84 |
| ONE BOX, EIGHT WEEKS' STORAGE. | | | | | | |
| Downs Co-operative Dairy Company, Toowoomba .. .. | 60 | 20 | 7 | 4 | 4 | 95 |
| Dungog (N.S.W.) Co-operative Dairy Company .. .. .. .. .. | 59½ | 20 | 7 | 4 | 4 | 94½ |
| A. L. Frederich, Townshend .. .. | 58 | 19½ | 7 | 4 | 3½ | 92 |
| Wide Bay Co-operative Dairy Company, Cooroy .. .. .. .. .. | 56½ | 19½ | 7 | 4 | 4 | 91 |
| Goombungee Co-operative Dairy Company | 56½ | 19 | 7 | 4 | 4 | 90½ |
| Warwick Dairying Company— | | | | | | |
| Texas .. .. .. .. .. | 56½ | 19½ | 7 | 4 | 3½ | 90½ |
| Goondiwindi .. .. .. .. | 56 | 19 | 7 | 3½ | 3½ | 89 |
| Allora .. .. .. .. .. | 54½ | 19½ | 7 | 4 | 3½ | 88½ |
| Millhill .. .. .. .. .. | 55 | 18½ | 6½ | 4 | 4 | 88 |
| Queensland Farmers' Co-operative Co.— | | | | | | |
| Grantham .. .. .. .. | 56 | 19 | 6½ | 4 | 4 | 89½ |
| Laidley .. .. .. .. .. | 56 | 19 | 6½ | 4 | 4 | 89½ |
| Boonah .. .. .. .. | 54½ | 18½ | 6½ | 4 | 4 | 87½ |
| Booval .. .. .. .. .. | 53 | 18 | 6 | 4 | 3½ | 84½ |
| Maclagan Valley Co-operative Dairy Company .. .. .. .. .. | 55 | 19½ | 7 | 4 | 3½ | 89 |
| Killarney Dairying Company .. .. | 55 | 19 | 7 | 4 | 4 | 89 |
| Caboolture Co-operative Dairy Company | 54½ | 19½ | 7 | 4 | 3½ | 88½ |
| Queensland Agricultural College, Gatton | 55 | 19½ | 6½ | 4 | 3½ | 88½ |
| Maleny Co-operative Dairy Company .. | 54½ | 19 | 6½ | 4 | 4 | 88 |
| Stanley River Co-operative Dairy Company, Woodford .. .. .. | 55 | 18½ | 7 | 4 | 3½ | 88 |
| Oakey Co-operative Dairy Company .. | 54 | 18½ | 7 | 4 | 4 | 87½ |
| Gayndah Co-operative Dairy Company .. | 54 | 19 | 6½ | 4 | 4 | 87½ |
| Silverwood, Gatton .. .. .. | 54½ | 19 | 6½ | 4 | 3½ | 87½ |
| Maryborough Co-operative Dairy Co.— | | | | | | |
| Kingaroy .. .. .. .. | 55 | 19 | 6½ | 4 | 3 | 87½ |
| Mundubbera .. .. .. .. | 54½ | 19 | 6½ | 4 | 3½ | 87½ |
| Maryborough .. .. .. .. | 53 | 18½ | 6 | 4 | 3 | 84½ |
| Biggenden .. .. .. .. | 53 | 18 | 6 | 3½ | 3½ | 84 |
| Kin Kin Co-operative Dairy Company .. | 54 | 19 | 7 | 4 | 3½ | 87½ |
| Logan and Albert Co-operative Dairy Company, Beaudesert .. .. .. | 54 | 19 | 6½ | 4 | 3½ | 87 |

ONE BOX, EIGHT WEEKS' STORAGE—*continued.*

| | Flavour. | Texture. | Colour. | Salting. | Packing. | Total. |
|---|---|---|---|---|---|---|
| Possible points .. .. .. | 65 | 20 | 7 | 4 | 4 | 100 |
| Terror's Creek and Samson Vale Co-operative Dairy Company .. | 53 | 19 | 6 | 4 | 3 | 85 |
| Roma Co-operative Dairy Company .. | 55 | 18½ | 6½ | .. | 3½ | 83½ |
| South Burnett Co-operative Dairy Company, Murgon .. .. .. .. | 52 | 18½ | 6 | 3 | 3 | 82½ |
| ONE BOX SALT BUTTER SALTED WITH AUSTRALIAN SALT. | | | | | | |
| Downs Co-operative Dairy Company, Toowoomba .. .. .. .. | 60 | 19½ | 7 | 4 | 4 | 94½ |
| Wide Bay Co-operative Dairy Company, Cooroy .. .. .. .. .. | 59 | 19 | 6½ | 4 | 4 | 92½ |
| Queensland Farmers' Co-operative Co.— | | | | | | |
| Booval .. .. .. .. .. | 58 | 19 | 7 | 4 | 4 | 92 |
| Boonah .. .. .. .. | 56½ | 19½ | 6½ | 4 | 4 | 90½ |
| Grantham .. .. .. .. | 55 | 19½ | 7 | 4 | 4 | 89½ |
| Laidley .. .. .. .. .. | 56 | 19½ | 7 | 4 | 4 | 90½ |
| Terror's Creek and Samson Vale Co-operative Dairy Company .. .. | 54½ | 18½ | 6½ | 4 | 3 | 86½ |
| Goombungee Co-operative Dairy Company | 57 | 19½ | 7 | 4 | 4 | 91½ |
| Warwick Dairy Company— | | | | | | |
| Texas .. .. .. .. .. | 54½ | 19½ | 7 | 4 | 4 | 89 |
| Allora .. .. .. .. .. | 56 | 19 | 6½ | 4 | 3 | 88½ |
| Millhill .. .. .. .. .. | 56 | 19 | 7 | 4 | 3½ | 89½ |
| Maclagan Valley Co-operative Dairy Company .. .. .. .. .. | 54½ | 19 | 7 | 4 | 3½ | 87½ |
| Oakey Co-operative Dairy Company .. | 53 | 19½ | 7 | 4 | 4 | 87½ |
| Maleny Co-operative Dairy Company .. | 57½ | 19 | 7 | 4 | 4 | 91½ |
| Kin Kin Co-operative Dairy Company .. | 53½ | 19 | 6 | 4 | 3 | 85½ |
| Logan and Albert Co-operative Dairy Company, Beaudesert .. .. .. | 54 | 19 | 7 | 3½ | 4 | 87½ |
| A. L. Frederich, Townshend .. .. | 57 | 18 | 7 | 4 | 2½ | 88½ |
| Queensland Agricultural College, Gatton | 54½ | 19½ | 6½ | 4 | 3½ | 88 |
| South Burnett Co-operative Dairy Company, Murgon .. .. .. .. | 55 | 19 | 6 | 4 | 3 | 87 |
| Singleton (N.S.W.) Central Co-operative Dairy Company .. .. .. | 54 | 19½ | 6½ | 4 | 4 | 88 |
| Maryborough Co-operative Dairy Co.— | | | | | | |
| Maryborough .. .. .. .. | 56 | 19 | 6½ | 4 | 3½ | 89 |
| Kingaroy .. .. .. .. | 57½ | 19 | 7 | 4 | 3½ | 91 |
| Biggenden .. .. .. .. | 54½ | 19 | 6 | 4 | 3½ | 87 |
| Mundubbera .. .. .. .. | 56 | 18½ | 6½ | 4 | 3½ | 88½ |

GREATEST AGGREGATE, ALL CLASSES AND SPECIALS.

Downs Co-operative Dairy Company, Limited, Toowoomba, 473½ points.

## MILKING TESTS.

### THE RESULTS.

The prizes were awarded according to the following scale:—One point for every ounce of commercial butter in twenty-four hours, taking the average of forty-eight hours' yield; one point for every completed ten days since calving, deducting the first forty days. Maximum allowance of lactation, ten points. Fractions of ounces of commercial butter

and incomplete periods of less than ten days to be worked out in decimals and added to the total points. In addition a declaration may be required to the effect that the cow has not broken her service during the lactation period.

COW, 4 YEARS AND OVER, AVERAGING GREATEST DAILY YIELD OF BUTEER FAT IN FORTY-EIGHT HOURS.

| —— | — | Milk. Lb. | Test. | Butter. | Total, 48 Hours. |
|---|---|---|---|---|---|
| Marquardt Bros.' Champion (Illawarra), 47·52 points (1) | M. | 19·13 | 14·7 | 1·08 | |
| | E. | 19·6 | 5·7 | 1·30 | |
| | M. | 19·5 | 5·2 | 1·22 | |
| | E. | 18·1 | 5·1 | 1·09 | |
| Nestle's Maggie 2nd of Numba (Holstein), 44·8 points (2) | M. | 34·5 | 3·2 | 1·27 | |
| | E. | 31·2 | 4·3 | 1·57 | |
| | M. | 33·6 | 3·2 | 1·24 | |
| | E. | 30·02 | 4·3 | 1·52 | |
| H. Benbow's Joyce, 41·58 points (3) .. | M. | 27·0 | 3·1 | ·97 | |
| | E. | 28·10 | 4·0 | 1·32 | |
| | M. | 30·10 | 3·5 | 1·25 | |
| | E. | 27·14 | 3·9 | 1·27 | |

COW, 4 YEARS AND OVER, AVERAGING QUALITY AND DAILY YIELD OF BUTTER FAT FOR FORTY-EIGHT HOURS, NO LACTATION TEST.

| | | | | | |
|---|---|---|---|---|---|
| Nestle's Maggie 2nd of Numba, 44·8 points (1) | M. | 34·5 | 3·2 | 1·27 | |
| | E. | 31·2 | 4·3 | 1·57 | |
| | M. | 33·6 | 3·2 | 1·24 | |
| | E. | 30·2 | 4·3 | 1·52 | |
| H. Benbow's Joyce, 38·48 points (2) .. | M. | 27·0 | 3·1 | ·97 | |
| | E. | 28·10 | 4·0 | 1·38 | |
| | M. | 30·10 | 3·5 | 1·25 | |
| | E. | 27·14 | 3·9 | 1·27 | |
| Marquardt Bros.' Dairymaid, 32·64 points (3) | M. | 21·8 | 3·7 | ·93 | |
| | E. | 21·7 | 4·2 | 1·05 | |
| | M. | 19·9 | 3·3 | ·75 | |
| | E. | 21·6 | 5·4 | 1·35 | |

COW OR HEIFER, UNDER 4 YEARS, NO LACTATION TEST.

| | | | | | |
|---|---|---|---|---|---|
| B. O'Connor's Stella 2nd of Hillview, 37·21 points (1) | M. | 23·12 | 3·8 | 1·06 | |
| | E. | 22·7 | 4·4 | 1·15 | |
| | M. | 23·6 | 4·3 | 1·17 | |
| | E. | 21·10 | 5·0 | 1·27 | |
| Marquardt Bros.' Canary, 30·96 points (2) | M. | 19·6 | 4·3 | ·97 | |
| | E. | 18·10 | 4·5 | ·98 | |
| | M. | 20·7 | 3·9 | ·93 | |
| | E. | 18·9 | 4·6 | ·97 | |
| A. T. Waters's Favourite of Railway View, 30·32 points (3) | M. | 23·2 | 3·8 | 1·04 | |
| | E. | 22·3 | 3·9 | 1·01 | |
| | M. | 21·5 | 2·9 | ·71 | |
| | E. | 23·4 | 4·0 | 1·03 | |

COW OR HEIFER, UNDER 4 YEARS, AVERAGING GREATEST DAILY YIELD OF BUTTER FAT FOR FORTY-EIGHT HOURS.

| | | | | | |
|---|---|---|---|---|---|
| Marquardt Bros.' Canary, 34·06 points (1) | M. | 19·6 | 4·3 | ·97 | |
| | E. | 18·10 | 4·5 | ·98 | |
| | M. | 20·7 | 3·9 | ·93 | |
| | E. | 18·9 | 4·6 | ·99 | |

COW OR HEIFER, UNDER 4 YEARS, ETC.—*continued.*

| | — | Milk. Lb. | Test. | Butter. | Total, 48 Hours. |
|---|---|---|---|---|---|
| E. Burton's Oxford Golden Girl, 33·2 points (2) | M. | 18·6 | 4·0 | ·86 | |
| | E. | 16·5 | 4·6 | ·88 | |
| | M. | 17·13 | 4·3 | ·90 | |
| | E. | 16·6 | 4·2 | ·81 | |
| A. T. Waters' Favourite of Railway View, 30·32 points (3) | M. | 23·2 | 3·8 | 1·04 | |
| | E. | 22·3 | 3·9 | 1·01 | |
| | M. | 21·5 | 2·9 | ·71 | |
| | E. | 22·4 | 4·0 | 1·03 | |

COW, YIELDING LARGEST SUPPLY OF MILK IN FORTY-EIGHT HOURS.

| | | | | | |
|---|---|---|---|---|---|
| Nestle's Maggie 2nd of Numba, 128·15 points (1) | M. | 31·5 | .. | .. | |
| | E. | 31·2 | .. | .. | |
| | M. | 33·6 | .. | .. | |
| | E. | 30·2 | .. | .. | |
| H. Benbow's Joyce, 114·2 points (2) .. | M. | 27·0 | .. | .. | |
| | E. | 28·10 | .. | .. | |
| | M. | 30·10 | .. | .. | |
| | E. | 27·14 | .. | .. | |
| M. Lawrence's Model of City View, 65·13 points (3) | M. | 15·11 | .. | .. | |
| | E. | 16·9 | .. | .. | |
| | M. | 16·6 | .. | .. | |
| | E. | 17·3 | .. | .. | |

Special prize under similar conditions, Maggie 2nd of Numba.

NATIONAL CHAMPION BUTTER FAT TEST.

(Brisbane Newspaper Co.'s special prize of £25, to be won thrice, and cash prize of £2 2s. to each year's winner), for cow averaging greatest daily yield of butter fat for forty-eight hours, under Babcock test.

| | | | | | |
|---|---|---|---|---|---|
| Marquardt Bros.' Champion, 47·52 points (1) | M. | 19·13 | 4·7 | 1·08 | |
| | E. | 19·6 | 5·7 | 1·30 | |
| | M. | 19·15 | 5·2 | 5·2 | |
| | E. | 18·1 | 5·1 | 5·1 | |
| Nestle's Maggie 2nd of Numba, 44·8 points (2) | M. | 34·5 | 3·2 | 1·27 | |
| | E. | 31·2 | 4·3 | 1·57 | |
| | M. | 33·6 | 3·2 | 1·24 | |
| | E. | 30·2 | 4·3 | 1·52 | |
| H. Benbow's Joyce, 41·58 points (3) .. | M. | 27·0 | 3·1 | ·97 | |
| | E. | 28·10 | 4·0 | 1·32 | |
| | M. | 30·10 | 3·5 | 1·25 | |
| | E. | 27·14 | 3·9 | 1·27 | |

HOME MILKING TEST.

*Various Breeds.*

| | | | | | |
|---|---|---|---|---|---|
| M'Intyre Bros.' Handsome (1) .. .. | M. | 28½ | 3·6 | 1·29 | |
| | E. | 29¼ | 4·6 | 1·57 | |
| | M. | 27½ | 4·0 | 1·28 | |
| | E. | 27¾ | 4·2 | 1·36 | 5·50 |

*Holsteins.*

| | | | | | |
|---|---|---|---|---|---|
| Maggie 2nd of Numba (1) .. .. .. | M. | 26¼ | 3·55 | 1·10 | |
| | E. | 23½ | 4·9 | 1·35 | |
| | M. | 27 | 3·5 | 1·10 | |
| | E. | 22 | 4·7 | 1·21 | 4·76 |

HOME MILKING TEST—*continued.*

| | — | Milk. Lb. | Test. | Butter. | Total, 48 Hours. |
|---|---|---|---|---|---|
| Nolly 1st of Kabbinokka (2) .. .. | M. | 30 | 2·6 | ·90 | |
| | E. | 26½ | 4·0 | 1·23 | |
| | M. | 29½ | 3·0 | 1·02 | |
| | E. | 25 | 3·9 | 1·14 | 4·29 |
| *Jerseys.* | | | | | |
| W. J. Affleck's Golden Lily II. of Grasmere (1) | M. | 23·5 | 5·3 | 1·46 | |
| | E. | 24·0 | 4·4 | 1·25 | |
| | M. | 23·0 | 5·9 | 1·60 | |
| | E. | 23·5 | 4·6 | 1·26 | 5·56 |
| W. J. Affleck's Floss 6th of Grasmere (2).. | M. | 15·5 | 6·3 | 1·14 | |
| | E. | 14·5 | 5·4 | ·92 | |
| | M. | 13·75 | 5·4 | ·87 | |
| | E. | 16·0 | 4·8 | ·90 | 3·83 |
| *Ayrshires.* | | | | | |
| F. A. Stimpson's Pretty Maid of Harelmar (1) | M. | 35 | 4·55 | 1·89 | |
| | E. | 34 | 5·60 | 2·25 | |
| | M. | 36 | 4·50 | 1·90 | |
| | E. | 37 | 5·45 | 2·40 | 8·44 |
| F. A. Stimpson's Tina of Coolangatta (2) | M. | 31 | 4·15 | 1·50 | |
| | E. | 28 | 4·45 | 1·46 | |
| | M. | 31 | 4·35 | 1·58 | |
| | E. | 34 | 4·25 | 1·69 | 6·23 |
| F. A. Stimpson's Model of Harelmar (3) .. | M. | 33 | 4·25 | 1·67 | |
| | E. | 31 | 3·87 | 1·40 | |
| | M. | 33 | 4·0 | 1·54 | |
| | E. | 30 | 3·3 | 1·15 | 5·76 |
| J. W. Paten's Jean (4) .. .. .. | M. | 25½ | 3·9 | 1·16 | |
| | E. | 22 | 4·4 | 1·13 | |
| | M. | 26 | 3·8 | 1·16 | |
| | E. | 22 | 4·5 | 1·17 | 4·62 |
| *Illawarras.* | | | | | |
| *M. Marquardt's Champion (1) .. .. | M. | 23¾ | 4·0 | 1·10 | |
| | E. | 23½ | 5·1 | 1·41 | |
| | E. | 23 | 5·9 | 1·04 | |
| | M. | 20½ | 5·2 | 1·25 | |
| | M. | 22½ | 4·6 | 1·215 | |
| | E. | 23¾ | 5·0 | 1·397 | 7·412 |
| B. O'Connor's Charm of Glenthorne (2) .. | M. | 35 | 4·3 | 1·76 | |
| | E. | 29 | 4·8 | 1·64 | |
| | M. | 34 | 3·8 | 1·57 | |
| | E. | 30 | 4·5 | 1·59 | 6·49 |
| B. O'Connor's Blue Belle (3) .. .. | M. | 24 | 4·05 | 1·15 | |
| | E. | 23 | 8·2 | 1·60 | |
| | M. | 25 | 5·1 | 1·50 | |
| | E. | 21·5 | 4·9 | 1·235 | 5·470 |
| B. O'Connor's Fairy Queen II. (4) .. | M. | 30·5 | 4·35 | 1·55 | |
| | E. | 24 | 4·7 | 1·32 | |
| | M. | 26 | 3·8 | 1·16 | |
| | E. | 25 | 3·9 | 1·14 | 5·17 |

* Early and late milkings shown.

## PIG AWARDS.

*Boars* (Judge, H. M. Warburton, Mittagong, N.S.W.).—Improved Berkshires: boar, 2 years and over, Macfarlane Brothers' Onward 1, Goodna Hospital for Insane's Goodna Serang 2. Year and under 2, W. J. Warburton's Northgate Model Count 1, Queensland Agricultural College's Red Knight 2. Six months and under 1 year, Macfarlane Brothers' Conargo Invincible 1, Goodna Hospital for Insane's Barney 2. Under six months, W. J. Warburton's Northgate Romper 1, Dunwich Benevolent Asylum 2. Family group, boar and two of progeny: Goodna Hospital for Insane's Goodna Serang 1, Macfarlane Brothers' Onward 2. Champion: Macfarlane Brothers' Onward.

*Sows.*—Improved Berkshires, 2 years and over: Goodna Hospital for Insane's Goodna Lavina 1, Macfarlane Brothers' Miss Request 2. Year and under 2: W. J. Warburton's Northgate Queen 1, Queensland Agricultural College's Conceit 2. Six months and under year: W. J. Warburton's Northgate Empress 1, Goodna Asylum's Lady Bell 2. Under 6 months: Goodna Asylum's Goodna Polly 1, W. J. Warburton's Northgate Blossom 2. Any age, litter not over 6 weeks old: W. J. Warburton's Northgate Happy Emperor 1, Gatton College's Vanity Fair 2. Champion: W. J. Warburton's Northgate Queen.

*Yorkshires.*—Boar, over 2 years: W. J. Warburton's Rupert's Pride. Six months and under year: Gatton College's Gatton Snow King. Under 6 months: W. J. Warburton's Northgate Roger. Champion: W. J. Warburton's Rupert's Pride. Sow, over 2 years: W. J. Warburton's Northgate Snowflake and Rupert's Fancy 1 and 2. Year and under 2: W. J. Warburton's Northgate Duchess. Six months and under year: W. J. Warburton's Northgate Laura and Northgate Ruby 1 and 2. Under 6 months: W. J. Warburton's Northgate Pearl. Champion: W. J. Warburton's Northgate Duchess.

*Tamworth.*—Boar, 2 years and over: D. W. Evans's Royal King. Six months and under 1 year: D. W. Evans's Indian Prince 1, Dunwich Benevolent Asylum 2. Under 6 months: D. W. Evans's Sunbeam. Champion: Dunwich Benevolent Asylum. Sow, over 2 years: D. W. Evans's Indian Queen. Year and under 2: D. W. Evans's Knowles Queen. Six months and under year: Dunwich Benevolent Asylum 1 and 2. Under 6 months: D. W. Evans's Princess Knowle. Champion: D. W. Evans's Knowles Queen.

*Miscellaneous.*—Three bacon pigs, 100 lb. to 150 lb.: J. J. Fitzgerald 1, C. Bright 2. Any breed or cross, from 120 lb. to 150 lb.: H. B. Baldwin 1, W. J. Warburton 2. Three porker pigs, 60 lb. to 80 lb.: W. J. Warburton 1, Queensland Agricultural College 2. Sow, with litter, not over 6 weeks: Wm. Geo. Osborne.

## FARM AND DAIRY PRODUCE.

(Judge, R. E. Soutter, Roma.)

*Cereals.*—Milling wheat: E. J. Anderson. Any other variety: E. J. Anderson 1, J. Brosnan 2. Milling barley: F. Franke. 90-day maize, any variety: C. Behrendorff. White: A. Loweke 1, Jas. Barbour, junr., 2. Early Leaming: John Stenzel. Yellow, horsetooth: John Stenzel 1, C. Behrendorff 2. Yellow, Dent: C. S. Huxley 1, A. Loweke 2. Any other yellow variety: Day and Bridge 1, C. S. Huxley 2. White: C. Behrendorff 1, John Fielding 2. Oats, Algerian: John Fielding 1, J. E. Stanton 2. Rye, millet (giant and white): John Fielding. Millet, imphee: C. Behrendorff. Cow peas, brown: C. S. Huxley. Black: C. Behrendorff 1, John Fielding 2. Any other variety: John Fielding. Canary, 50 lb.: Thos. W. Glasheen.

*Potatoes* (blue varieties).—Circular Heads: John Young. Guyra, Coronations, or Commonwealths: A. J. Moon 1 and champion, A. Loweke 2. Manhattans: A. Loweke. Brownell varieties—true to name: H. Franke. Peach bloom: H. Franke. Satisfaction: A. J. Moon 1 and champion, H. Franke 2. Queen of Valley: A. Loweke. White varieties —Carmens: Joseph Sinnamon 1 and 2. Scottish Triumphs: George Spiller 2, no first. Up to Date: H. Franke. Collection: H. Franke 1, A. Loweke 2. Sweets, white table: James Barbour, junr., 1, J. C. Butler 2. Cattle: James Barbour, junr. Red, table: J. C. Butler. Crown pumpkins: J. E. Stanton 1, John Fielding 2. Ironbark: J. C. Butler. Bugle: John Fielding.

*Hay, Chaff, and Ensilage.*—Lucerne hay: Charles Baulch 1, H. Franke 2. Oaten and panicum: H. Franke. Lucerne chaff: Charles Baulch 1, J. E. Stanton 2. Oaten: W. T. Beverley 1, John Williamson 2. Panicum, giant and white: John Fielding. Panicum, Japanese: H. Franke. Wheaten hay: George Hands 1, John Fielding 2. Rhoades: John Fielding 1, H. Franke 2. Rye: John Fielding. Canary: H. Franke. Mixed, lucerne and oaten: Charles Baulch 1, J. E. Stanton 2. Mixed lucerne and wheaten: John Fielding 1, C. S. Huxley 2. Lucerne and panicum: John Fielding 1, H. Franke 2.

*Grasses.*—Any other variety: H. Edser.

*Bacon, Etc.*—Six sides (factory cured), hams (factory cured), sausage, and lard: J. C. Hutton Proprietary, Ltd., won all the prizes. Hen eggs: Mrs. R. Loff 1, Mrs. A. Wyllie 2.

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## YOUNG JUDGES' COMPETITION.

Open to young farmers or farmers' sons and others, 25 years of age and under.

*Swine* (Judge, A. Moles, Bald Hills).—Leslie Arthur Warburton, Northgate, 1; David A. Logan, Bundamba, 2. The judge remarked as follows:—"In reference to this section I expected to see a greater number of young men competing. Those that came before me had a fair knowledge of their work. I would suggest that the Association encourage this section."

## QUEENSLAND CHAMBER OF AGRICULTURAL SOCIETIES.

Minutes of the Annual Meeting of the Queensland Chamber of Agricultural Societies, held in the National Assocation's Council Room, Show Grounds, Brisbane, on Wednesday, 15th August, 1917, at 7.30 p.m.

Mr. John Macdonald (President) occupied the chair. His Excellency, Sir Hamilton J. Goold-Adams, was present, also the Minister for Lands, Hon. J. M. Hunter, and Mr. E. G. E. Scriven (Under Secretary, Department of Agriculture and Stock). Others present included Messrs. W. J. Affleck (Hon. Treasurer), G. H. Pritchard (Vice-President, representing Charters Towers), R. S. Archer, F. W. De Little, and H. Hill (Rockhampton), Ernest Baynes (Blackall), C. J. Booker, M.L.A. (Maryborough and Kilkivan), A. C. Thompson (Dalby), J. A. Pardy (Rosewood), J. P. Bottomley (Ipswich), A. J. M. Chapman (Noosa), Thos. Chappell (Charters Towers), J. N. Parkes (Townsville), R. P. Watson (Ipswich), M. Gleeson and E. Thorne (Clifton), D. Wildermuth (Toombul), W. J. Johnston (Pine Rivers), F. Shaw (Caboolture), S. Holmes (Pittsworth), A. B. Marquis (Zillmere), W. J. Lacey and A. W. Kirkley (Gayndah), W. A. A. Bates (Biggenden), W. M. Charles (Maryborough), J. Dean (Allora), Donald Gunn, M.L.A. (Goondiwindi), Gerard Noble (Toowoomba), B. J. Stark (Southern Queensland—Beenleigh), T. B. Murray-Prior (Fassifern), S. P. Fraser (Barcaldine), J. Hiron (Lowood), D. McIntyre (Goombungee), Chas. Baulch (Laidley), and J. Bain (Hon. Secretary).

An apology for non-attendance was received from Hon. W. Lennon, Minister for Agriculture.

*President's Address.*—The President, in opening the meeting, expressed pleasure at seeing such a large and representative gathering. He had pleasure in announcing that since their last meeting six more societies had affiliated, the membership of the Chamber now totalling 61 societies. He considered that this was good evidence that the work done by the executive was appreciated by agricultural societies. He briefly reviewed the annual report, and stated that they were very pleased to have His Excellency the Governor with them. It showed that His Excellency took a keen interest in the work of the Chamber when he came to spend the evening with them after having had such a strenuous day. They also had with them the Minister for Lands, Mr. Hunter, who had hardly missed a meeting since they had started, and they were always pleased to see him.

Minutes of the previous meeting having been previously circulated amongst members were taken as read and confirmed.

### ANNUAL REPORT AND HON. TREASURER'S FINANCIAL STATEMENT.

The report and balance-sheet, which had been circulated amongst members and delegates, was taken as read and adopted. The financial report showed that receipts since last meeting had amounted to £78 5s. 8d., and expenditure £55 8s. 1d., leaving a credit balance in the

Government Savings Bank of £113 17s. 1d. Mention was made in the report of the arrangement made on behalf of affiliated societies with the Commissioner for Insurance by which, instead of every exhibitor being compelled to insure his riders and drivers in ring events at a cost of 5s. per day, the societies relieved exhibitors of all such bother by arranging that a flat rate should be charged the societies, such rate ruling according to the size of the society, from £3 per annum down to £1 per annum. The report notified that quite a number of societies had already availed themselves of this concession. Reference was also made to the good work which had been done on behalf of the societies with the Railway Department, the principal item being with regard to the continuance during the present year of the concession made to exhibitors of live stock at shows.

### GOVERNOR'S ADDRESS.

His Excellency the Governor, who was received with applause, thanked the delegates for the kind invitation which had been extended to him to be present. He made explanation regarding remarks which he had made at Barcaldine on the subject of wool, explaining that at many of the centres he had visited he had noticed the absence of sheep, and had expressed regret that there were not more sheep shown. At the Barcaldine Show he had noted a fair display of sheep, and stated that they were the best he had seen at any show, not —as the report stated—that he had seen in Queensland. He trusted that his explanation would remove any feeling which might have been caused due to this incorrect report. He was very pleased to be present at the meeting, and was glad to find that six additional societies had come into the circle during the past year. It was most desirable that every society should join, for their interests were in common. One of the very grave problems was what classes of stock they considered the best for the country, and he congratulated the societies upon the good work which they were doing towards assisting the solving of this problem.

### HORSE BREEDING.

Mr. Ernest Baynes gave a brief address on the subject of the improvement of horse breeding. He pointed out that it was a most important matter, and one to which they could not pay too much attention, for horses of the proper sort would undoubtedly prove to be one of the finest assets imaginable to the State. Last October the Federal Government had called a conference of representatives of agricultural societies, and there certain facts relating to the horse-breeding business had been disclosed. After the outbreak of the war the Federal authorities went into the question of ascertaining what horses were available for military purposes, and to their surprise found that only 2½ per cent. of the horses in Australia were fit for military purposes. When it was explained that the horses embraced in these figures included even those under four and over twelve years, and also brood mares and foals, it could easily be understood how fatal had been the system of horse-breeding in the past. It was imperative, if horse-breeding was to be

improved, that better stallions should be used. He urged that agricultural societies should make it a condition that all stock should be entered in stud books. Nothing would improve live stock more than stud-book registration. He hoped that breeders would take particular notice of the fine lot of military horses which were being paraded daily on the Show Grounds, so that they could ascertain the type required for military purposes.

A discussion followed the reading of this paper, the general tenor being in favour of the certification and taxation of stallions with a view to eliminating undesirable nondescripts which were too prevalent in our State. His Excellency's suggestion that a sub-committee should be appointed to give advice to those trying to find good stallions was received with unanimous approval, and it was decided that the suggestion should be considered by the executive, who would take the necessary steps to make it effective.

A motion was carried to the effect that the Government should be asked to introduce a Bill providing for the registration of stallions, also for a stallion tax, and, further, to prevent the importation of horses of undesirable type.

### INOCULATION FOR TICK FEVER.

A motion was submitted by the Rockhampton Agricultural Society—

> "That the Chamber urge the Government to take immediate steps to secure more effective means for improving and perfecting the process of inoculation for tick fever, and to this end the services of a leading scientist with reliable assistance be secured."

Mr. R. S. Archer and Mr. Booker spoke on this subject, submitting very emphatic arguments in its favour. It was unanimously agreed to adopt the motion, and to urge that the Government, if possible, get the loan from South Africa of Dr. Tyler, who was stated to be the most eminent living authority known on the tick question.

### EDUCATIONAL PAPERS.

It had been intended that papers should be read by Mr. Cuthbert Potts and Mr. F. W. De Little, the former on "Agricultural Education in connection with the future development of the State," and the latter on the subject of "Cotton Growing," but as the lateness of the hour prevented justice being done to the importance of both papers, it was decided to publish them in conjunction with the minutes, so that they could be read and discussed at next meeting of the executive.

### ELECTION OF OFFICERS.

The following officers were elected for the ensuing year:—

President—Mr. John Macdonald.
Vice-Presidents—Messrs. G. H. Pritchard and Ernest Baynes.
Hon. Treasurer—Mr. W. J. Affleck.
Hon. Secretary—Mr. J. Bain.
Hon. Auditor—Mr. C. J. Booker, M.L.A.

# Pastoral.

## BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| P. Young .. .. | Talgai West, Ellinthorp | 2 | 42 | Milking Shorthorn Herd Book of Queensland |
| L. H. Paten .. .. | "Jeyendel," Calvert, S. & W. Line | 8 | 21 | Ayrshire Herd Book of Queensland |
| F. C. G. Gratton .. | "Towleston," Kingsthorpe | 2 | 14 | Holstein Cattle Club Herd Book |
| T. Mullen .. .. | "Norwood," Chelmer | 3 | 20 | Queensland Jersey Herd Book |
| J. H. Paten .. .. | Yandina .. .. | 6 | 21 | Ayrshire Herd Book of Queensland |
| Queensland Agricultural College | Gatton .. .. | 2 | 6 | Ayrshire Herd Book of Queensland |
| | | 2 | 3 | Holstein-Friesian Herd Book of Australia |
| | | 3 | 13 | Jersey Herd Book of Queensland |
| J. W. Paten .. .. | Wanora, Ipswich .. | 10 | 42 | Ayrshire Herd Book of Queensland |
| M. W. Doyle .. .. | Moggill .. .. | 4 | 12 | Queensland Jersey Herd Book |
| G. A. Buss .. .. | Bundaberg .. .. | 1 | 15 | Herd Book of the Jersey Cattle Society of Queensland |
| W. Rudd .. .. | Christmas Creek, Beaudesert | 2 | 10 | Milking Shorthorn Herd Book of Queensland |
| M. F. and R. C. Ramsay | Talgai, Clifton .. | 5 | 27 | Herd Book of the Jersey Cattle Society of Queensland |
| George Newman .. | Wyreema .. .. | 9 | 37 | Holstein-Friesian Herd Book of Australia |

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| R. Conochie .. .. | Brooklands, Tingoora | 9 | 21 | Queensland Jersey Herd Book |
| W. J. Barnes .. .. | Cedar Grove .. | 10 | 37 | Queensland Jersey Herd Book |
| T. B. Murray-Prior .. | Maroon, Boonah .. | 2 | 37 | Queensland Shorthorn and Australian Herd Books |
| W. J. Affleck .. .. | Grasmere, N. Pine .. | 6 | 31 | Queensland Jersey Herd Book |
| A. J. McConnel .. | Dugandan, Boonah | 19 | 36 | Australian Hereford Herd Book |
| A. Pickels .. .. | Blackland's Stud Farm, Wondai | 4 | 62 | Illawarra Dairy Cattle Herd Book of Queensland |
| G. C. Clark .. .. | East Talgai, Ellinthorp | 3 | 7 | New Zealand Herd Book |
| H. D. B. Cox .. .. | Sydney (entered brother's name) | 3 | 16 | Commonwealth Standard Jersey Herd Book |
| J. T. Perrett and Son | Coolabunia .. .. | 2 | 36 | Illawarra Herd Book of Queensland |
| State Farm .. .. | Kairi .. .. | 4 | 8 | Ayrshire Herd Book of Queensland |
| | | 1 | 2 | Holstein-Frisian Herd Book of Australia |
| E. M. Lumley Hill .. | Bellevue House, Bellevue | 45 | 127 | Australian Hereford Herd Book |
| W. F. Savage .. .. | Ramsay .. .. | 1 | 12 | Illawarra Herd Book of Queensland |
| Tindal and Son .. | Gunyan, Inglewood | 50 | 400 | Australian Hereford Herd Book |
| J. N. Waugh and Son | Prairie Lawn, Nobby | 3 | 28 | Queensland Jersey Herd Book |
| J. H. Fairfax .. .. | Marinya, Cambooya (2) | 9 | 55 | Ayrshire Herd Book of Queensland |
| C. E. McDougall .. | Lyndhurst Stud, Warwick (2) | 25 | 100 | Queensland Shorthorn Herd Bock |
| J. Holmes .. .. | "Longlands," Pittsworth | 6 | 20 | Ayrshire Herd Book of Queensland |
| P. Biddles .. .. | Home Park, Netherby | 1 | 20 | Illawarra Dairy Cattle Association |
| A. Rodgers .. .. | Torran's Vale, Lanefield | 1 | 9 | Milking Shorthorn Herd Book |
| R. S. Alexander .. | Glenlomond Farm, Coolumboola | 1 | .. | Holstein-Frisian Herd Book of Queensland |
| State Farm .. .. | Warren .. .. | 3 | 83 | Ayrshire Herd Book of Queensland |
| S. H. Hosking .. .. | Toogooloowah .. | 2 | 15 | Holstein Cattle Club Herd Book |
| W. J. H. Austin .. | Hadleigh Jersey Herd, Boonah | 1 | 2 | Queensland Jersey Herd Book |
| Ditto .. .. | ditto .. .. | .. | 6 | Commonwealth Standard Herd Book |
| H. M. Hart .. .. | Glen Heath Stud, Yalangur | 7 | 21 | Ayrshire Herd Book of Queensland |

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH JUNE TO 28TH JULY, 1917.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Lady Melba | Holstein ... ... | 14 Feb., 1917 | 912 | 3·8 | 40·63 | |
| Lady Margaret | Ayrshire ... ... | 14 Sept., 1916 | 683 | 4·8 | 38·65 | |
| Queen Kate | ,, ... ... | 30 June, 1917 | 971 | 3·4 | 38·58 | |
| College Bluebell | Jersey ... ... | 28 June ,, | 773 | 3·8 | 36·43 | |
| Princess Kate | Ayrshire ... ... | 28 June ,, | 683 | 4·4 | 35·37 | |
| Auntie's Lass | ,, ... ... | 5 July ,, | 852 | 3·4 | 33·84 | |
| Buttercup ... | Shorthorn... ... | 2 June ,, | 779 | 3·5 | 31·90 | |
| Confidence... | Ayrshire ... ... | 25 June ,, | 780 | 3·4 | 30·99 | |
| Miss Bell ... | Jersey ... ... | 1 Aug., 1916 | 562 | 4·6 | 30·45 | |
| Rosine ... | Ayrshire ... ... | 21 June, 1917 | 729 | 3·5 | 29 85 | |
| Lady Loch II. | ,, ... ... | 3 June ,, | 715 | 3·5 | 29·28 | |
| Miss Security | Jersey ... ... | 27 Mar. ,, | 647 | 3·8 | 28·81 | |
| Hedges Madge | Holstein ... ... | 22 Mar. ,, | 610 | 3·9 | 27·91 | |
| Iron Plate ... | Jersey ... ... | 6 Dec., 1916 | 491 | 4·8 | 27·78 | |
| Thornton Fairetta | ,, ... ... | 30 June, 1917 | 410 | 5·4 | 26·17 | |
| Skylark ... | Ayrshire ... ... | 24 May ,, | 539 | 4·0 | 25·31 | |
| Lerida II. ... | ,, ... ... | 2 June ,, | 563 | 3·6 | 23·74 | |
| Snowflake ... | Shorthorn... ... | 17 May ,, | 499 | 3·9 | 22·83 | |
| Cocoatina ... | Jersey ... ... | 6 Mar. ,, | 451 | 4·3 | 22·82 | |
| Glade ... | Shorthorn... ... | 20 Mar. ,, | 504 | 3·8 | 22·45 | |
| Constancy ... | Ayrshire ... ... | 27 Dec., 1916 | 435 | 4·3 | 22·00 | |
| Lady Spec... | ,, ... ... | 17 Jan., 1917 | 463 | 4·0 | 21·74 | |
| Miss Betty | Jersey ... ... | 27 Mar. ,, | 469 | 3·9 | 21·46 | |
| Violette's Peer's Girl | ,, ... ... | 13 Dec., 1916 | 304 | 5·9 | 21·23 | |
| Miss Edition | ,, ... ... | 25 Dec. ,, | 393 | 4·4 | 20·35 | |
| Lilia ... | Ayrshire ... ... | 11 June, 1917 | 536 | 3·2 | 20·01 | |

## TANNING RABBIT SKINS.

Boil some wattle bark until it is of a thick, pasty consistence. Add enough water to make it the shade of brown required. Place the skin in the tan liquid, with the fur side of one resting on the skin side of the next, in layers till all are covered. Leave them in the liquor for a fortnight or twenty-one days—the longer period for preference. Then take them out, and peg them on a board, as when first dried. Leave them till thoroughly dry, and they will be fit for whatever use you may put them to. The skins should be a good brown colour.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JULY, 1917.

The total number of eggs laid during the month was 8,820. Westerly winds prevailed during the month, which resulted in the majority of the light breeds going off slightly. The heavy breeds did not waver, and some fine laying records were put up. Morris wins the monthly prize in the heavy breeds with the fine total of 173. In the light breeds, Miss Hinze wins with 146 eggs. R. Burns's bird in the single test laid 31 eggs for the month, bringing her total to 112 eggs in 122 days. Walters's pen of black Orpingtons laid 116 eggs up to the 20th, laying six per day for twelve days running; on the 21st, two of the hens went broody. Broodiness has occurred in all the heavy pens in the six-hen test, with the exception of those owned by Claussen, Manson, and Morris. In the single test, G. W. Holland's G. bird was the only case of broodiness. The eggs of all the competing pens have been weighed, but owing to there being such a big majority under 2 oz., and taking into consideration the bad weather that was experienced during the time the weighings were taken, it is deemed advisable to take a second weighing in more favourable weather. The health of all the birds has been excellent. The following are the individual records:—

| Competitors. | Breed. | July. | Total. |
|---|---|---|---|
| | LIGHT BREEDS. | | |
| E. Chester ... ... ... ... ... | White Leghorns ... | 129 | 490 |
| *G. H. Turner ... ... ... ... | Do. ... ... | 128 | 431 |
| W. Becker... ... ... ... ... | Do. ... ... | 117 | 424 |
| W. R. Crust ... ... ... ... | Do. ... ... | 124 | 403 |
| Oakland Poultry Farm ... ... ... | Do. ... .. | 110 | 398 |
| G. Chester ... ... ... ... ... | Do. ... ... | 128 | 397 |
| F. W. Leney ... ... ... ... | Do. ... ... | 142 | 391 |
| T. A. Pettigrove, Victoria ... ... | Do. ... ... | 123 | 389 |
| Chris. Porter ... ... ... ... | Do. ... ... | 143 | 386 |
| Moritz Bros., S.A. ... ... ... | Do. ... ... | 136 | 379 |
| *J. Zahl ... ... ... ... ... | Do. ... ... | 111 | 377 |
| *J. R. Wilson ... ... ... ... | Do. ... ... | 116 | 369 |
| T. Taylor ... ... ... ... ... | Do. ... ... | 110 | 369 |
| T. B. Hawkins ... ... ... ... | Do. ... ... | 114 | 361 |
| *A. W. Bailey ... ... ... ... | Do. ... ... | 110 | 359 |
| *J. M. Manson ... ... ... ... | Do. ... ... | 143 | 356 |
| J. G. Richter ... ... ... ... | Do. ... ... | 129 | 353 |
| Mars Poultry Farm ... ... ... | Do. ... ... | 127 | 349 |
| A. H. Padman, S.A. ... ... ... | Do. ... ... | 75 | 345 |
| *A. T. Coomber ... ... ... ... | Do. ... ... | 114 | 341 |
| Kelvin Poultry Farm ... ... ... | Do. ... ... | 133 | 340 |
| Quinn's Post Poultry Farm ... ... | Do. ... ... | 139 | 337 |
| C. Knoblauch ... ... ... ... | Do. ... ... | 97 | 331 |

## EGG-LAYING COMPETITION—*continued.*

| Competitors. | Breed. | July. | Total. |
|---|---|---|---|
| **LIGHT BREEDS—*continued.*** | | | |
| D. Fulton | White Leghorns | 125 | 322 |
| R. Holmes | Do. | 110 | 320 |
| A. Shillig | Do. | 117 | 319 |
| *Mrs. J. R. D. Munro | Do. | 113 | 319 |
| *Dixie Egg Plant | Do. | 118 | 309 |
| Miss M. Hinze | Do. | 146 | 299 |
| F. Clayton, N.S.W. | Do. | 116 | 285 |
| J. L. Newton | Do. | 115 | 281 |
| Geo. Williams | Do. | 95 | 280 |
| *C. C. Dennis | Do. | 115 | 275 |
| L. G. Innes | Do. | 115 | 266 |
| *T. Fanning | Do. | 99 | 266 |
| Mrs. W. D. Bradburne, N.S.W. | Do. | 98 | 263 |
| *A. E. Walters | Do. | 123 | 256 |
| J. Holmes | Do. | 114 | 248 |
| G. J. White | Do. | 118 | 246 |
| G. Howard | Do. | 121 | 245 |
| E. Cross | Do. | 87 | 244 |
| Mrs. J. Carruthers | Do. | 114 | 240 |
| Mrs. F. J. Sear | Do. | 110 | 224 |
| C. H. Singer | Do. | 93 | 223 |
| E. A. Smith | Do. | 106 | 220 |
| C. P. Buchanan | Do. | 85 | 216 |
| J. Ferguson | Do. | 94 | 208 |
| S. C. Chapman | Brown Leghorns | 86 | 206 |
| *Dr. E. C. Jennings | White Leghorns | 91 | 190 |
| **HEAVY BREEDS.** | | | |
| *R. Burns | Black Orpingtons | 161 | 444 |
| A. E. Walters | Do. | 157 | 408 |
| W. Smith | Do. | 156 | 405 |
| F. A. Claussen | Rhode Island Reds | 142 | 387 |
| *Mars Poultry Farm | Black Orpingtons | 138 | 386 |
| W. S. Hanson, N.S.W. | Do. | 147 | 358 |
| *E. F. Dennis | Do. | 151 | 337 |
| D. Kenway, N.S.W. | Do. | 114 | 337 |
| Cowan Bros., N.S.W. | Do. | 133 | 333 |
| P. C. McDonnell, N.S.W. | Do. | 131 | 319 |
| H. Jobling, N.S.W. | Do. | 111 | 303 |
| Mrs. J. H. Jobling, N.S.W. | Do. | 143 | 279 |
| King and Watson, N.S.W. | Do. | 121 | 268 |
| F. Clayton, N.S.W. | Rhode Island Reds | 79 | 241 |
| *Oakland Poultry Farm | Black Orpingtons | 128 | 230 |
| C. B. Bertelsmeier, S.A. | Do. | 138 | 228 |
| R. Burns | S. L. Wyandottes | 141 | 224 |
| E. Morris | Black Orpingtons | 173 | 213 |
| *E. A. Smith | Do. | 152 | 208 |
| C. C. Dennis | White Wyandottes | 109 | 207 |
| *Kelvin Poultry Farm | Plymouth Rocks | 120 | 190 |
| *Miss M. Hinze | Black Orpingtons | 141 | 174 |
| J. M. Manson | Do. | 134 | 174 |
| *F. W. Leney | Rhode Island Reds | 78 | 158 |
| Totals | | 8,820 | 22,235 |

* Indicates that the bird is engaged in the single hen test.

RESULTS OF SINGLE HEN TESTS.

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| G. H. Turner ... ... ... | 53 | 67 | 86 | 79 | 67 | 79 | 431 |
| J. Zahl ... ... ... ... | 76 | 55 | 82 | 27 | 80 | 57 | 377 |
| J. R. Wilson ... ... ... | 67 | 60 | 58 | 64 | 68 | 52 | 369 |
| A. W. Bailey ... ... ... | 36 | 47 | 71 | 69 | 67 | 69 | 359 |
| J. M. Manson ... ... ... | 65 | 54 | 51 | 53 | 59 | 74 | 356 |
| A. T. Coomber ... ... ... | 67 | 9 | 72 | 69 | 52 | 72 | 341 |
| Mrs. J. R. D. Munro ... ... | 86 | 46 | 46 | 46 | 25 | 70 | 319 |
| Dixie Egg Plant ... ... ... | 50 | 62 | 64 | 70 | 62 | 0 | 308 |
| C. C. Dennis ... ... ... | 53 | 43 | 15 | 51 | 55 | 58 | 275 |
| T. Fanning ... ... ... | 14 | 55 | 56 | 52 | 33 | 56 | 266 |
| A. E. Walters ... ... ... | 28 | 38 | 35 | 54 | 60 | 41 | 256 |
| Dr. E. C. Jennings ... ... | 20 | 11 | 33 | 44 | 63 | 19 | 190 |
| R. Burns .. ... ... | 51 | 40 | 83 | 58 | 100 | 112 | 444 |
| Mars Poultry Farm ... ... | 62 | 79 | 54 | 75 | 59 | 57 | 386 |
| E. F. Dennis ... ... ... | 52 | 46 | 67 | 69 | 71 | 22 | 327 |
| Oakland Poultry Farm ... ... | 70 | 27 | 28 | 23 | 67 | 15 | 230 |
| E. A. Smith ... ... ... | 27 | 23 | 28 | 65 | 37 | 28 | 208 |
| Kelvin Poultry Farm ... ... | 43 | 22 | 19 | 70 | 13 | 23 | 190 |
| Miss M. Hinze ... ... ... | 33 | 25 | 28 | 34 | 33 | 21 | 174 |
| F. W. Leney ... ... ... | 23 | 24 | 0 | 20 | 69 | 22 | 158 |

## THE POULTRY INDUSTRY IN QUEENSLAND.

The following informatory paper on this subject was read by Mr. J. Beard, Instructor in the Poultry Industry, Department of Agriculture and Stock, at the Poultry Conference, held at the Queensland Agricultural College, Gatton, on 21st August last:—

As no doubt you are aware, the poultry industry for a number of years past has been very much neglected, and has been allowed to run its own course. This can be accounted for to some extent owing to the want of attention to this branch of rural industries in the past.

It is to be regretted that Australia has not yet decided that it should be self-supporting in the matter of poultry. Unfortunately, into some of the States, Queensland included, both eggs and egg pulp were being imported. I hope, and I feel certain you will agree with me, that the importation of eggs and pulp from the East will be unknown in the immediate future.

I regard the poultry industry of Queensland, so far, as being in its infancy, although it is annually progressing. In America big things were being done, and what the industry was doing for itself in America should strike all Queenslanders. It really showed how very important the industry was.

People need have no fear of the venture, and should have no need to think they were entering on a venture that was not an important one. A great deal had been done in Australia, and already the value of the production annually was close on £2,000,000.

From the returns supplied from the various petty sessions districts, ranging from Rockhampton to the southern borders of the State, and also

including the districts of Herberton, Cairns, and Mackay, which forwarded their returns and are here included, the following figures will enable you to form some idea of the value of the returns of the poultry industry. Unfortunately, towns such as Rockhampton, Bundaberg, Maryborough, Gympie, Brisbane, Ipswich, Toowoomba, and Warwick are not included in these returns. Large towns in America, and the other States of the Commonwealth, are not included in these annual returns.

The decrease in poultry in 1915 from that of 1914 was by no less than 208,573, and eggs by more than 10,500,000; taking the average price of eggs in 1915 at 1s. 6d. per dozen, the loss was over £65,000.

Dugandan with 33,839 common fowls, or 35,779 all kinds, and total egg production 135,033 dozen, although much less than 1914, is again in the first place.

Brisbane follows with 29,030 head of poultry (all kinds), and 127,058 dozen eggs.

Maroochy returns 100,542 dozen eggs, third place with only 16,348 birds. Harrisville and Gatton run very close in number of all fowl, 98 in favour of Harrisville, which returned 35,623 dozen eggs in excess of Gatton.

Rockhampton returned 19,333 birds, and 86,550 dozen eggs.

Rosewood returned 17,753 birds and 85,431 dozen eggs, which is a better average.

For the year 1916, Dugandan again heads the list with 39,874 fowls, showing an increase of 4,094, although the increase in eggs only totalled 787 dozen.

Brisbane also holds the second place again with 33,810 fowls, showing an increase of 4,780, while her egg supply increased by 30,806 dozen.

Harrisville and Gatton run very close again as to the number of fowls, 59 being in favour of Harrisville as against 98 last year; the latter also shows a return of 112,414 dozen eggs, being an increase of 42,458 over that of last year. Gatton egg returns show 69,956 dozen, an increase of 12,320 dozen for the year.

The following table will enable you to form some idea of the industry as it stands at the present time. I will not give you an outline of the whole of the districts embraced in the returns, as it would take up too much time. I will leave that for the Press to publish.

The totals are as follows for the years 1914, 1915, 1916:—

| Year. | Fowls. | Ducks. | Geese. | Turkeys. | Others. | Eggs. |
|---|---|---|---|---|---|---|
| | | | | | | Dozens. |
| 1914 .. .. | 906,772 | 41,070 | 7,785 | 28,334 | 2,487 | 3,429,908 |
| 1915 .. .. | 729,163 | 25,321 | 6,166 | 15,688 | 1,559 | 2,554,687 |
| Decrease .. | 177,609 | 15,749 | 1,619 | 12,666 | 903 | 875,221 |

Total decrease of fowls, all kinds, 208,573.

Although the prospects of the industry were brighter for the year 1916, and show an increase over that of 1915, the returns still show a large falling off from the 1914 returns. The totals are as follows:—

| Year. | Fowls. | Ducks. | Geese. | Turkeys. | Others. | Eggs. |
|---|---|---|---|---|---|---|
| | | | | | | Dozens. |
| 1916 .. .. | 821,016 | 38,499 | 7,196 | 21,046 | 2,925 | 2,782,914 |
| Increase .. | 91,853 | 13,178 | 1,030 | 5,378 | 1,366 | 228,227 |

The total increase for the year 1916 over and above the year 1915 was 112,805 fowls of all kinds, still showing a shortage of 95,768 fowls and 646,994 dozen eggs. I trust the foregoing returns will impress upon your minds that there is need for greater improvement. This can be done by organising the poultry industry and encouraging production, and secure the Australian market for the Australian producer.

I would like to have a few words on turkey-raising. It seems to be an established fact that turkey-raising in this State is on the decline, where years ago a flock numbering 100 or 200 was a profitable adjunct on the country farms. Now these birds are found but rarely, and then in flocks of a dozen or less, tolerated rather than fostered. The cause is hardly apparent. The thickening settlements have not yet encroached upon the solitude of many a backlying farm where green paddocks and sheltering timbered country offer ready for use the best possible food and shelter. True, they may damage to some extent the growing crops, but they will render services much more valuable than what they destroy in the wholesale destruction of grasshoppers and insects which threaten the farmer on every hand, and which they incessantly pursue as the principal article of their diet.

I will not touch on turkeys any more than to give you some idea of the turkeys raised in this State. I find for the year ended 1914, 28,334 turkeys were accounted for, while for 1915 we only got returns for 15,668, showing a decrease of 12,666. Putting them on the low average of 8s. per head means a loss of £5,066 8s. to the producer. For the year 1916 we got a more favourable return of 21,046, or an increase of 5,378 over the preceding year.

For the year 1915, Warwick takes first place by supplying 1,029, with Dalby second 1,004, Nanango 790, Beaudesert 673, and Harrisville 615.

For the year 1916, Dalby is easily first with 1,905, showing a very satisfactory increase of 901 turkeys. Warwick with only 1,079, showing only an increase of 50, takes second place, Beaudesert 912, Nanango 866, and Pittsworth 810. I have given the five leading districts for each year.

We have an ideal country for the production of high-class and utility poultry. No other portion of the world is so favoured in this respect, but the industry is still in its infancy. We should not fear over-production, as the demand for both eggs and poultry of the right kind is incessant.

## IN-BREEDING.

It is quite amusing to hear the opinions expressed by many poultrymen on this great subject. The man who thoroughly understands breeding knows for a certainty that he will never make any advance in his work unless he adopts the principle, and he succeeds where he realises the inherent dangers of the principle. For there are dangers, and it is failure to realise this fact that is responsible for the condemnation of the system among those who have not thoroughly studied it. While in-breeding is the most effective means we have at command of fixing type, it is also the most effective means of perpetuating defects. Thus, in-breeding with desirable prepotent animals enables us to gain, in the shortest possible time, the ideal we are aiming at; in-breeding with ordinary birds, weak perhaps in constitutional vigour, leads only to disappointment and degeneration. It is well, therefore, that those who are antagonistic to the principle should maintain their prejudice against it. In-breeding is not for them; it is better left to the man who may be regarded as a professional in his work, and who is guided not alone by egg performance but by signs of constitutional vigour and desirable type. The exceptional layer may be a freak, and not improbably leave disappointing stock, and the male birds from an exceptional layer may be a most undesirable bird for the breeding pen. We would warn poultry men against the extreme policy of introducing new blood; by this means retrogression is invited. It should be a simple matter where a good strain has been once obtained to bring back fresh blood from a reliable breeder of good female stock to whom a cockerel has been sold for breeding purposes. This use of half-blood is the simplest means we have at command of perpetuating desirable type. But even with this method the half-blood introduced should be a prepotent bird, typifying masculinity in the whole of his make-up.—"New Zealand Farmer."

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## TURKEYS AND THEIR MANAGEMENT.

By J. C. BEARD, Instructor in the Poultry Industry.

While I have not had as much experience in raising turkeys as a good many others, I have had continued experience with them for thirty-five years. Hence, my remarks will be from a practical standpoint.

Generally it is considered that one male will mate with six to twelve females. Some people have even only used one male to twenty-five hens. The latter plan is very unwise, and not worth the risk of using only one male with your entire flock.

For the following reasons:—A female usually allows the male to tread once. If, from any cause, the male did not effect proper connection, the eggs would not be fertile, and the best part of the season would be lost, because the first hatch is considered the best.

The hen, after connection, selects a place for her nest. This is usually done by scratching up the earth, so as to make a hollow place in which to keep the eggs from rolling out. A great deal of the risk of

males not fertilising the eggs could be avoided in the following way:—Use two males alternately every day, but under no consideration allow both males to run with the females at the same time. If you do this, you will, as a rule, have bad luck, as the males will fight and, at times, hurt themselves as well as the females.

The lack of fertility in eggs and vigour in young poults is one of the main reasons for the decline in turkey breeding in this State. I feel certain that the main cause is in-breeding. There are many turkey breeders who, in the past, have not thought it necessary to obtain new blood, and who thought they could save a few shillings by borrowing a male from a neighbour, in this way using the same blood year after year. This has been done for so many years that the vitality has been about bred out. The vitality has got so low that it creates disease, and I am sure that many of the turkey diseases with which we have to contend have been caused by lowering the vitality of the turkey. I believe there is no other variety of birds in which the vital forces decrease so rapidly by in-breeding as in the turkey.

I think it possible, under proper management, to raise turkeys in every part of the State, and I believe, if farmers in general would be more careful about in-breeding, and would see that they have the proper kind of males to breed from, such as will introduce new, strong, hardy blood into their stock, they will be able to raise turkeys as they did in years gone by.

## A WORD TO PURCHASERS.

When you wish to buy, first select a reliable breeder, and if you want breeding birds, you can easily purchase them at a reasonable figure; but if you want show birds for breeders (which are the best), do not expect them at common breeding stock prices, for no man's whole flock is composed of show birds, even if many of his old breeding stock were once show birds. If the breeder tells you that his birds were never beaten in a show, immediately learn where the birds were exhibited, whether in a local show or in a show like the National. No person has made a clean sweep at many large shows unless the competition was very small indeed.

Having selected your breeding stock, the next thing is to know how to feed. To ensure good health, the breeding stock must be provided with a variety of grain, grit, and charcoal. As a conditioner and health preserver, charcoal has no equal for the turkey family. When turkeys have free access to charcoal, very few will become sick or ailing. Good, sound short oats will be found the best all-round grain for turkeys, especially during breeding season. A small amount of maize and wheat can also be fed to good advantage. Over-fat specimens are, as a rule,

very poor breeders. Turkeys require a considerable amount of water, and should always have a liberal supply kept in the shade, free from the sun's rays. Where the breeders have the free range of the farm, they

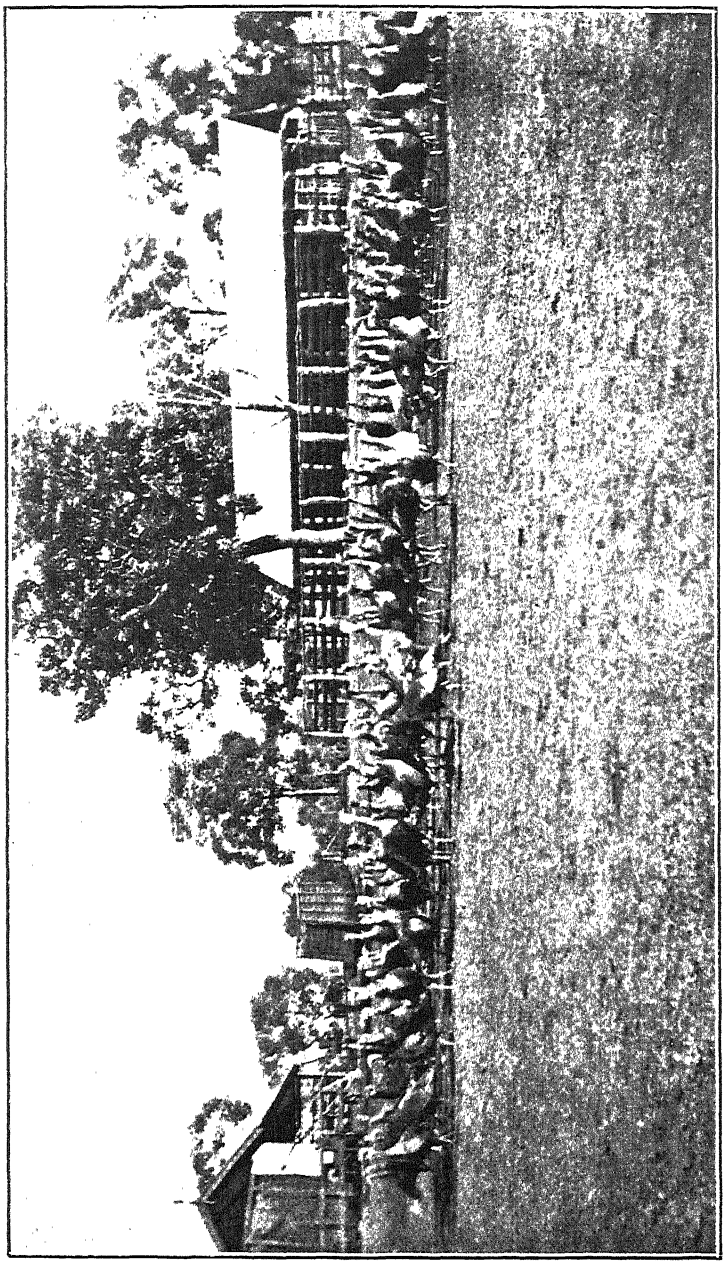


PLATE 19.—TURKEYS AT LARGE.

require very little grain food after they commence to lay. Many farmers hatch the first laying of turkey eggs under ordinary hens. While some make a success by this method, many more make a failure, as young

poults do not thrive with ordinary hens. For two principal reasons—namely, proper food and lice.

In their natural state, the young poults live almost entirely on insect food, which is not, and cannot be provided where brooded with the ordinary hen. Therefore, you would be feebly trying to make them thrive on food entirely foreign to nature. The better plan would be, when you have more eggs than the turkey hen can cover, to put all surplus eggs under ordinary hens at the same time as you set the turkey hen; and, as the eggs under the ordinary hen begin to chip, put them under the turkey hen, otherwise she may not take to them after their being hatched with the ordinary hen.

Having finished hatching, the time has arrived to try and rear your poults. These require no food for thirty-six hours after hatching. As a rule, many young turkeys are killed by over-feeding. On a farm where the hen turkey and her poults have plenty of range, it is best to feed them only twice each day, once in the morning and again at night. Young turkeys can live on insects and many small grasses which they relish. You will always find that food they get in the paddocks will keep them in better condition than anything you can give them. In seasons when there is a good supply of grasshoppers the turkey will live almost entirely on them.

When young turkeys have to be fed the best food I know of is stale bread, but be sure the bread is not sour. Moisten the bread with new milk that has been brought to three-parts boiling point, and allow it to cool before moistening the bread. This must be fed crumbly by pressing out the milk with your hand. This can be fed for three or four weeks. Then gradually get them to eat cracked wheat and maize. These grains should be scalded, as it will then assist digestion, but do not feed it until it has thoroughly cooled. Indigestion is very prevalent among turkeys, both young and full-grown. If the season is getting late and the warm weather sets in, discard maize in any form, as this is overheating and is the cause of many troubles in young turkeys.

Another splendid feed is hard-boiled eggs with onions chipped fine. To either feed some powdered charcoal should be added, which serves as a grit and prevents sourness of the crop, which is the cause of many deaths.

If your poults should have diarrhœa from any cause, one feed of boiled rice will usually stop the trouble. Another common, but sure, relief is to give them red pepper—say one tablespoonful. Mix it with about two tablespoonfuls of pollard. Then moisten it with water, but not wet enough to make it sticky. Cut it up into about four or six parts and in oblong shape, put them into an oven, and bake hard. It is well to have a few always in hand, as after baking, they will keep for a long time in a dry place.

If you have a turkey, either old or young, with a bad case of diarrhœa, give one pill three times a day until the droppings are improved. Then give a tablespoonful of castor oil, if the turkey is full grown, or a teaspoonful to a young poult. This treatment will often stop the worst cases of diarrhœa.

## INDIGESTION.

As a rule a turkey grows very fast, and has an appetite like an ostrich, but without on ostrich's digestive ability, as the natural way for a turkey to eat is to pick up a grain here and there in such a manner as to give the digestive organs a grain at a time to digest, then the digestive mill grinds slowly, without being clogged. This method of feeding keeps up a steady circulation and the turkey keeps growing larger and stronger, the digestive organs being developed as the turkey grows, and they are therefore better able to do their work when more food is required to be digested to build up a large frame. On the other hand, when the poults are overfed the machinery is clogged, and there is a general smash up, the effect being similar to that caused by throwing a bushel of maize into a corn cracker. The machine will do its work all right if fed slowly, as will the digestive organs of a turkey. A turkey is a voracious eater, and will eat as often as you feed it.

There are other causes that will bring death with very nearly the same symptoms. One is lice, and another is lack of sharp grit and charcoal. A turkey cannot grind its food without grit any more than a miller can grind wheat without millstones. We might as well try to chew our food without teeth. In many cases, it is the absence of sharp grit that is the cause of them going off colour and eventually dying. If they get a little sharp grit in their food every morning, it keeps their grinding apparatus in perfect order. Very young birds do not find the grit of their own accord, and as they grow older they are liable to gorge themselves with the grit as soon as they discover it, thereby clogging their digestive organs, while a small quantity in their food each morning keeps them in excellent condition.

The only road to success with turkeys is to keep them healthy. Give them plenty of exercise, commencing by letting them run through the middle of the day at three or four days old. Keep the lice off, and with good clean water to drink, they will have very few diseases. But exercise they must have. On no account let them run in the grass until the dew is off, or in the grass on rainy days. This is one of the chief causes of white diarrhœa, a good remedy for which is new milk boiled, in which a little nutmeg is grated and stirred well while boiling. This to be given the poults to drink when cold. This is also a sure remedy for any kind of chickens.

## TO PREVENT LICE.

Before setting the hen and placing the eggs in the nest, sprinkle tobacco dust in and around the nest, and again on the twenty-fifth day. By these means, you will quite, or almost, avoid any lice. But to make sure, it would be as well to rub a little pure lard on to each of the poult's heads. Dust both the mother and poults with some well-known brand of insect powder. If you think this too expensive, you could make up some yourself by obtaining 1 lb. flower of sulphur, 1 lb. of carbolic powder, and 2 lb. of fine white wood ashes, thoroughly mixed, and used from a duster made from any round tin with a few small holes perforated in the lid, as in a pepper box. Look carefully for the lice, for they are hard to find. Lice will kill a poult in a very short time.

## TO ACHIEVE SUCCESS IN TURKEY RAISING.

Breed only from vigorous well-matured stock.

Keep stock in healthy condition.

Do not let poults run in wet grass.

Do not overfeed or starve young poults.

Make war on the lice.

Prevent disease by disinfection.

Use your best judgment and common sense.

Give plenty of range. The turkey is naturally a wild bird, and will not thrive in confinement.

Good grit, oyster shell, charcoal and fresh water should not be forgotten as an important part of their ration.

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## SPADE UP FEEDING PLACES.

In many places feed for the flock is scattered on the ground, and the chickens are continually fed within a small space, says a bulletin of the W.A. Department of Agriculture. The surface of the ground soon becomes foul with the droppings of the flock. True, the sunshine acts as a germicide, and if the space is at all sloping the washing of the rain helps to keep the surface clean, but generally the spot is level and often muddy. The ground quickly becomes contaminated with the continual tramping of the flock, and if there be one sick fowl the whole flock may soon become infected. This is especially true with small chicks and young turkeys. The first advice given in cases of general loss is "change your feeding place," but it is often impossible to find another location so convenient and accessible.

The poultry specialist of the University of Manitoba points out that the spading-up of the feeding place once or twice per week will bring good results. It will tend to purify the ground, and it will induce exercise on the part of the flock, which is always desirable. Especially is this true when the flock is confined in yards, and green feed, so necessary, is difficult to obtain. If grain is scattered, as one spades up the ground much will be buried so deep that hens will not scratch it out and it will be thrown up at the next spading with green, succulent blades that are greatly relished by the flock.

This method of spading up the feeding places is often worth trying, and the results in avoiding infectious diseases and improving the general health of the flock should be watched; with, of course, the reservation that the constant turning over of the same soil in a small run may eventually mean the working and reworking of heaps of droppings, which is not good.

# The Horse.

## MULE RAISING IN AUSTRALIA.

By E. BAYNES.

The usefulness of mules depends in a great measure upon the circumstance that they combine in a remarkable degree the constitutional attributes of their parents on both sides. Descended originally from the species of wild ass inhabiting the rocky semi-desert of Upper Egypt, where food is scarce and the heat intense, the jacks transmit to their hybrid progeny the faculty for resisting privation and withstanding tropical heat, which horses do not possess.

The value of mules cannot be overestimated. This has for a long time been realised in most parts of the world, although in England and Australia ignorance and prejudice have debarred their use on any big scale.

The testimony of those who have had experience of both horses and mules is convincing as to the superiority of the latter. They live longer and are able to withstand the effects of hard work for a greater number of years; they are constitutionally stronger, and less liable to sickness, to which horses are subject; they can be kept on coarser and cheaper food, and they are hardier and able to resist extremes of temperature, especially heat. Their narrow and small hoofs make them more sure-footed than horses, and they can pick their way over mountains and on the edge of precipices without much risk of disaster, and in positions such as these show more pluck and caution than horses.

These all-round advantages of mules over horses in the way of economy of keep outweigh the disadvantages with respect to certain uses. It is conceded at once that a mule is not as fast as a horse, and the heaviest draught mules are not as good as the heavy Clydesdales for actual pulling power; but an ordinary team of mules will beat the ordinary team of horses for pulling and for travelling great distances where food is scarce.

There are two distinct types of jacks in Europe. Those for getting heavy draught mules are bred in Poiton, in the West of France. The height of these is about 15 hands. In America, where hundreds of thousands of mules are bred each year, the Spanish or Catalonian jacks are the most popular. The Kentucky mules are famous all over America, and owe their fame to two Catalonian jacks imported to America in about 1830 or 1840 and crossed with the ordinary female donkeys of the State. They have produced a most useful strain of mule-breeding jacks. It is said that all the best mules in America owe their quality to the infusion

of those two jacks. So highly appreciated are mules in the West States that in 1890 150,000 mules were foaled. At the present time something like 200,000 are foaled annually.

Anyone who has visited America must be struck with the numbers used. One sees them doing heavy dock work and railway work in the country, ploughing and ordinary farm work, and they are invaluable in mining and pack work. They will carry over 200 lb. over rough, high country, if properly loaded.

It is generally considered that three mules can be kept on fodder that would only be sufficient for two horses. They are peculiar creatures, and it has been proved they will pull better if a mare is in the lead, for, having been foaled and brought up by mares, they have a great affection for horses and a corresponding dislike for asses. With regard to the question of the fertility of mules, it appears to be admitted on all hands that they are absolutely sterile when paired together. The objection that is taken to mules on the score of bad temper and obstinacy may be dismissed by the remark that, in the opinion of competent judges, these so-called vices are the outcome of mismanagement and cruelty to beasts of highly-nervous temperament, which require kindness and intelligence in handling.

In a letter, dated September, 1916, to a friend of mine, Colonel Peacocke, of the Remount Department of India, and an officer of the War Office, says: "The American mule has been a perfect revelation to many people—all of them as quiet as sheep, and the percentage of mules to horses in all veterinary hospitals, and the wastage of mules compared to horses, is very small. We have brought them in three classes: (1) a few heavy mules, 16-17 hands weighing from 1,300 lb. to 1,500 lb., for use of heavy guns in Egypt; (2) artillery draught mules 15-2, weighing about 1,100 lb., and (3) what we call carters, that which can go in draught in the limbered service waggons. I fancy when her soldiers go home they will, all of them, have nothing but praise for the American-bred mule. I wish Australia would go in for breeding mules."

Mr. J. S. Love, of Townsville, a gentleman who probably knows more about the remount question than most shippers—i.e., the type of horse required, &c.—has been importing many high class blood stallions to breed remounts on his own stations, and has lately gone in for mule breeding. We went to great trouble and expense in getting two really high-class Spanish jacks, and as these are doing duty in the far North, ideal country for mule breeding, I anticipate Mr. Love will make a success of it. I should think his lead worth following.

I have endeavoured to show some of the many good points of the mule, and I hope breeders in Queensland will go in for it. We have great areas of second-class land in the State, rough, stony ridges which are admirably adapted for mule breeding; but to those who are thinking of taking it up, let me caution them to be careful about the jack, the selection of the jack is of as much importance as that of a good sire in horse breeding. Never forget like begets like.

# The Orchard.

## THE "DUNNING" SEEDLESS ORANGE.

Notice having appeared in a previous issue of the "Agricultural Journal" respecting a new Navel orange named "Dunning's Seedless," specimens of this fruit have been obtained by the Director of Fruit Culture, Mr. A. H. Benson. Same have been photographed, and are reproduced herewith.

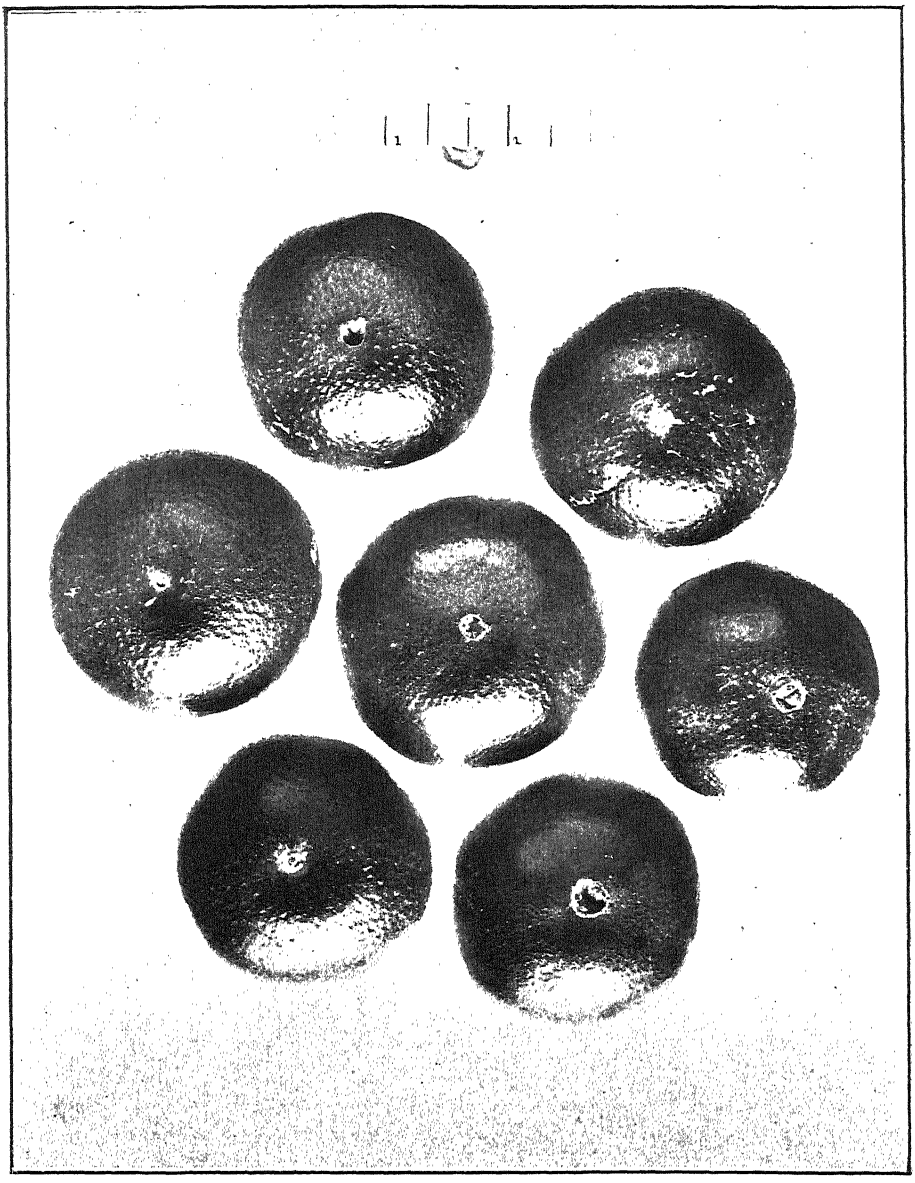


PLATE 20.—THE "DUNNING" NAVEL ORANGE.

Respecting this orange the Director states:—The fruit is of large size, averaging about 3¼ in. in diameter. In shape it is flatter than the average Washington Navel. The skin is of good colour and texture, and of moderate thickness, individual specimens possessing remarkably thin

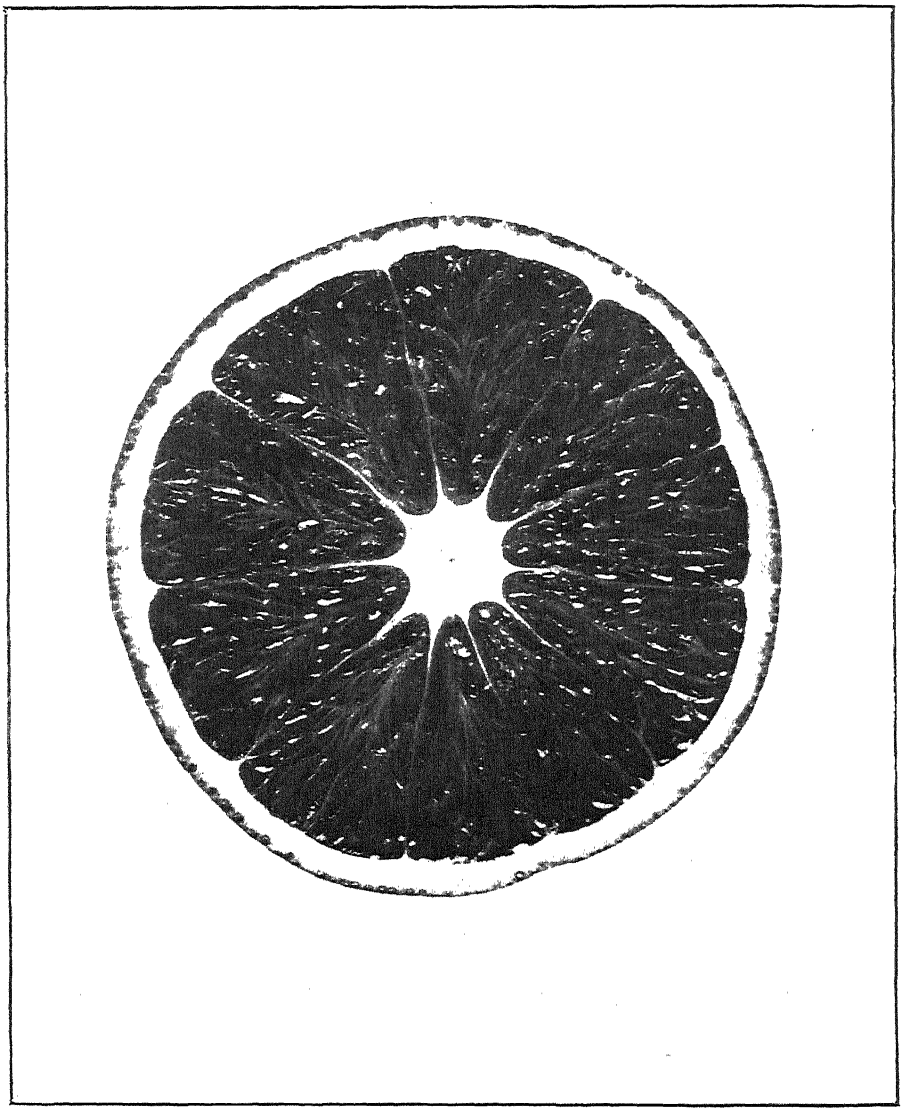


PLATE 21.—SECTION OF THE "DUNNING" SEEDLESS ORANGE.

skins. It differs from the Washington Navel in that the skin at the base is very much thinner as a rule than it is in this variety.

With respect to the Navel, this is usually very indistinct, and there is seldom any waste in the fruit which occurs when the Navel is large and distinct.

The flesh is firm, of good quality, and the flavour is excellent. The fruit is practically seedless, as it is only very occasionally that a seed is met with. The percentage of rag in the fruit is small.

With regard to the tree, the habit of growth is strong and vigorous, with large dark-green leaves. The tree is very thorny.

Owing to the fact that it is a Queensland-raised seedling, it is extremely likely that the good bearing qualities it has already developed will be maintained, and if this is so it will be undoubtedly a very much more profitable variety to grow than the Washington, which is frequently an uncertain cropper.

The Dunning's Navel has also one further advantage, and that is, owing to the inconspicuous navel, there is not the same chance of the fruit being attacked by the larvæ of the spotted peach moth, which frequently causes serious injury to the older sorts of Navels by boring into the fruit from the navel, which forms a natural protection for the egg of the moth and the newly hatched larvæ.

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## THE CASABAS AND THEIR CULTIVATION.

Referring to a fruit new to Queensland, which was introduced by Mr. Mobsby, of the Agricultural Department, on his return from the Panama Exposition, and who has since successfully raised the plant, Mr. B. Harrison, F.R.H.S., of Burringbar, New South Wales, writes in the local newspaper:—

"These magnificent fruits are as yet practically unknown here, where they could be grown as easily as melons or pumpkins. They are totally distinct from ordinary rock or water melons, and in a class by themselves. In California, U.S.A., where the climate is similar to ours, they are very profitable, and are grown extensively, and hundreds of car loads are forwarded to the Eastern States each season. There are many varieties, the best of which appears to be the Improved Hybrid, Golden Hybrid, Beauty, and White African; they all possess a most delicious flavour, and are more nutritious and sustaining on account of the firmer flesh than ordinary melons. They ripen up to quite late in the fall, and keep well into early winter, and if stored in a cool place will keep still later. Varieties placed in a sunny window for a few days will ripen well. In appearance most of them resemble a hard, heavy, wrinkled melon, and vary in weight from 10 lb. to 20 lb. The vines are robust and vigorous, and the foliage is larger than that of rock melons, and they are very

prolific. When the soil is not rich it should be well worked and manured, planting two to three seeds in each hill 12 ft. to 13 ft. apart. The soil should be kept loose round the plants until the vines begin to run, when they should be earthed up. When wanted for market, to which they carry well, the fruit should be taken from the vines when they lose their green lustre, but should not be eaten until about a week or so after they turn yellow, or give slightly under pressure as with a mellow apple. The flesh is firmer than that of ordinary rock melons, without any stringiness, and the flavour is splendid. Their cultivation should prove very lucrative to our farmers, who should readily obtain from 1s. to 3s. each for them, and they can be marketed right into the winter months, when other melons have disappeared."

Mr. Mobsby distributed some forty or fifty seeds from fruit produced in his own garden, and next season should see a considerable number of these melons on the market.

## AN EASY WAY OF CURING LEAF CURL.

"A fruit farmer of many years' experience in Tasmania," says the "Tasmanian Fruitgrower" (7th July), "guarantees that a wire nail, if large enough, if not a piece of plain wire, driven through the trunk of a peach or plum tree will speedily cure the worst case of leaf curl."

## "A CART HORSE WHICH WILL TROT."

A correspondent of the "Live Stock Journal," London, remarks:—"We have it now from Lord Derby that the type of horse most required for the Army is 'a cart horse which will trot,' and the sooner we begin to breed him the better. It is to be hopd that the Board of Agriculture will commence by offering some inducement to breeders to produce stallions of the type required, as, unless the sire is of the right type as well as the dam, we shall by further cross-breeding make it far harder in the future than it has been in the past to produce what we require." If Lord Derby's dictum be correct, why import the Percheron while we have in the Clydesdale a horse that can move a weight and trot with it?

It is interesting, in view of the experiment being made with the Percheron in England, to note that British artillery officers at the front are speaking in high terms of the Suffolk for artillery purposes. Lord Lonsdale, by the way, according to recent Home exchanges, has purchased three Suffolk mares to cross with his Percheron stallion!

# Horticulture.

## FOUR METHODS OF PROPAGATING GLOXINIAS.

The first, by seeds—When sown the seed should only be *very slightly* covered with very fine soil, and watering must be done with a fine rose can or, better still, with a garden syringe. The tin, pot or pan, should be covered with glass and shaded with paper. The glass requires to be turned over or wiped daily to remove the moisture that collects on the under surface. As soon as the seedlings can be handled they must be pricked off into other tins, or better, small pots—one to a pot. When established, a cool part of the veranda, but not a windy part, will provide a suitable position for them, and all that is necessary is to remove them to larger pots or tins as the growth of the plant demands. They should have received their last potting by Christmas.

After potting, the plants, which are inclined to be top-heavy, often refuse to stand upright, and there is a temptation to build the soil up higher to support them. This is fatal! Instead, take a few small pieces of stick and support the head of the plant by thrusting the sticks into the soil around the neck. Matches are ideal for this purpose.

A second is by dividing the old corms by cutting them so as to leave buds on each division (it is not advisable to split into more than two pieces).

A third method, by taking the young spring growths from old corms and striking them as cuttings. The latter method usually requires bottom heat, *i.e.*, heat beneath the cutting bed, produced either by decaying manure or hot water pipes, &c.

And lastly, but probably the most simple, is the leaf-cutting method. There are two ways of using the leaves. They may be inserted in the soil with a portion of the leaf stalk attached just as a cutting would be. A bulb will form at the base of the leaf stalk, and is then grown on in the usual way. Or a leaf with the mid-rib cut through at the back at a distance of about an inch apart may be pegged down flat on the soil surface and covered with glass as in the case of the seed. Numerous bulbs will form along the mid-rib where the cuts have been made and can be re-potted when the leaf decays.

These last two methods enable the grower to quickly work up a stock of any favourite colours or styles of flowers, but it must be noted that neither will be successful unless well matured leaves are used. Leaf cuttings enable one to work up a stock of these plants with little or no expense, for it is often possible to beg a leaf where one would have to buy a plant.

### SOIL.

Mr. W. Stubbins, of Cape Town, South Africa, recommends—1 part good garden soil; 1 part leaf mould; ½ part old decayed cow manure (or 1 lb. Clay's fertiliser per bushel of soil); ½ part peat or chopped cocoanut fibre (rooted if possible); sharp sand to keep soil open.—"South African Gardening."

# Tropical Industries.

## SUGAR AND COTTON IN THE WEST INDIES.

### THE RUSH TO PLANT SUGAR-CANE.

It will be admitted everywhere that the West Indies have experienced an extraordinary stroke of good fortune in that favourable seasons and high prices for sugar have prevailed for the last two years, since the beginning of the war. It is only to be expected that such conditions should render cane cultivation an attractive proposition and should tend to obscure the minds of those interested in this crop as to other aspects of the agricultural situation.

The increased interest that is being taken in sugar-cane is well reflected by the distribution of plants from the various Botanic Stations. It will perhaps serve a useful purpose to quote a few figures. In St. Vincent in 1913-14, the number of cuttings distributed was 8,500; in 1914-15, this jumped to 17,550; while in 1915-16 the high distribution was fairly well maintained at 14,900. In St. Lucia, during 1915-16, 3,000 cane cuttings were distributed to Crown land purchasers against nil the previous year. In Antigua, in 1915-16, the number of cuttings distributed was 254,617, which is about double the normal distribution. The case of Montserrat is even more striking. In 1913-14 there were 2,332 cane cuttings distributed; in 1914-15, 11,900; and in 1915-16, 17,676.*

The enticing aspects of sugar-cane cultivation have been shown to be responsible for considerable extensions of the area devoted to this crop. Some of this land was previously under cotton, and this fact brings up a point of special economic importance. It seems that owing to an unfavourable season there is likely to be a shortage of West Indian cotton next year. At the same time the demand for fine staple cotton in England is steadily growing stronger, owing to its employment for special purposes incident on the war. Consequently, abnormally high prices are likely to prevail. Under such conditions there may be more in cotton than in sugar, while from an Imperial point of view, West Indian cotton is obviously a most important product to produce since the mother country is dependent on these islands for its chief supply. Again cotton possesses an advantage over sugar in that it will stand indefinite storage, while the crop itself occupies the land for only half

* During the year 1916-1917, the Queensland Sugar Bureau distributed 1,000 tons of sugar-cane cuttings gratis to growers in this State.—ED. "Q.A.J."

the time required by sugar-cane, which allows of the cultivation of provision crops, fitting in well with the policy of more locally produced food.

The general line of argument, then, which it is sought to bring forward is the need for giving attention to the present agricultural position as a whole, and the danger that lies in allowing one's outlook to be obscured by the boom in sugar. Manifestly the position of the sugar-cane planter to-day is an extremely good one, but he should remember that there are four prime factors to his prosperity—market, season, labour, and ships. It is the last two which are of fundamental importance at the present time.

The revived interest which these figures and the previously mentioned facts convey is obviously the outcome of the favourable conditions of production recorded at the beginning of this article. The position of the grower is perfectly understandable: chances (of none too frequent occurrence) are in favour of big profits from cane cultivation, and the grower is seizing, and rightly seizing, his opportunity. But from a colonial point of view, from the point of view of the community, it is well to acknowledge the fact that the rush to plant sugar-cane is merely to fill a partial vacuum produced by the war, and it is well to remember that this, like conditions of climate, may change at any moment. The results might then be disastrous.—"Agricultural News," Barbados.

## SOCIETIES, SHOW DATES, ETC.

Sandgate.—Brighton Farmers' and Fruit-growers' Progress Association. A. E. Streeter, secretary.

Malanda, No. 2.—The Eacham Pastoral, Agricultural, and Industrial Society. Duncan Brown, secretary. Show dates: 29th and 30th August, 1918.

Nerang.—South Queensland and Border Agricultural and Pastoral Association. H. A. Weedon, Secretary. Show Date, 5th October, 1917.

Jardine—Jardine Farmers', Dairymen's, and Fruitgrowers' Association. F. Maleozka, Secretary.

# Botany.

## ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, Acting Government Botanist.

No. 11.

"DEVIL'S FIG" (SOLANUM LARGIFLORUM, *n.sp.*)*

*Full Botanical Description.*—A large scrambling shrub, the branchlets and foliage densely villous with stellate hairs. Prickles not very numerous on the branches, very rare on the petioles and under surface of the leaves, and none on the inflorescence. Leaves petiolate, rarely entire, usually irregularly sinuate, oblique at the base, thinly covered on the upper surface with a stellate pubescence, densely stellate-tomentose on the under surface and petioles, broadly ovate, acuminate, length 3-5½ in., breadth 2-3¾ in. Peduncles axillary once or twice forked, bearing numerous flowers on slender pedicels. Calyx thinly stellate-pubescent at the time of flowering 1½ lines long, with acuminate teeth on lobes somewhat enlarged in fruit and divided into ovate lanceolate lobes. Corolla white, deeply lobed, about ½ in. diam., lobes densely tomentose on the central portion outside. Fruit globular, glabrous, ½-¾ in. diam.

*Habitat.*—Kin Kin, *Francis and White*. (Type specimens.)

*Notes on the Species.*—We also have specimens of this *Solanum* in the Queensland Herbarium from Bundaberg and Childers, and it, no doubt, is to be found in other localities. It has always been placed previously as a southern form of *S. Dallachii*, and as such I left it until Mr. A. Francis, some few months back, drew my attention to it being a great pest in the Kin Kin district, and soon after that, a letter was received by the Home Department from the Noosa Shire Council asking for the botanical name of the plant, and that it be proclaimed a noxious weed. As the plant differs in some respects from *S. Dallachii* and does not seem to agree with any extra-Australian species, I have determined to name it as above. A more technical account is reserved for the next *Botany Bulletin*.

*Acknowledgment.*—My thanks are due to Professor A. J. Ewart, Government Botanist, Melbourne, for kindly comparing specimens of *S. largiflorum* sent him, with Mueller's type specimens of *S. Dallachii*, in the collections under his charge.

* As this paper describes a new species it is necessarily somewhat technical.

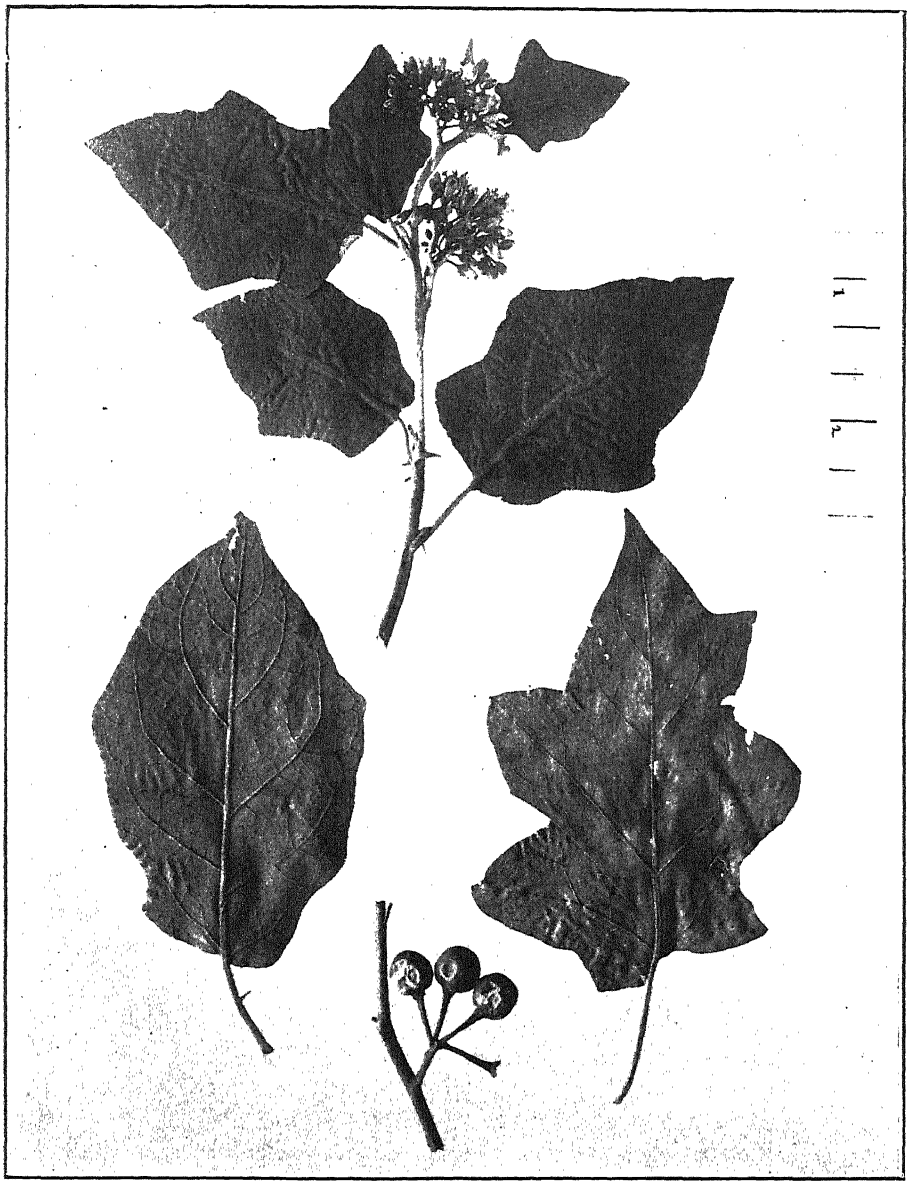


PLATE 22.—"DEVIL'S FIG" (SOLANUM LARGIFLORUM).

*Botanical Name.*—*Solanum* (derivation unknown) *largiflorum* (the specific name is given on account of it bearing numerous flowers. The flowers are not large in comparison with other species of the genus. In a genus of several hundred species such as Solanum, it is rather a difficult matter to choose suitable new specific names).

*Local Names.*—"Devil's Fig" is the common vernacular; it is also known as "Chinese Fig." This latter name is undesirable as the plant is a native, not an introduction; the name "Chinese Fig" does not necessarily point to the plant being an alien, as this adjective is often applied to undesirable plants: for instance, throughout Western Queensland *Bassia Birchii* or *Anisacantha Birchii* is universally known as "Chinese Burr," though the plant is endemic in Australia.

The aboriginal name "Koori" of the old Bundaberg natives given under *Solanum Dallachii* by F. M. Bailey ("Queensland Flora," p. 1087) belongs to this new species.

*Eradication.*—It is customary on our coastal "scrub" farms to allow such weeds as these Native Solanums (Wild Tobacco, Kangaroo Apple, Potato Bush, &c.) to run their course and die out; as the plant under notice, however, is about to be proclaimed a noxious weed more stringent measures will have to be taken in its control. Where the plants are few they may be grubbed out; cutting off close to the surface of the ground if carried out repeatedly should exhaust the vitality, but the treatment would have to be persistent to be successful; a little brine or a small amount of caustic soda and arsenic about the cut surface would prove useful. Spraying with arsenical solutions is not likely to prove of value and is out of the question where cattle are running, but an arsenical solution injected into the main root or branch should prove successful.

## THE PRICE OF SEED COTTON FOR THE 1917-18 CROP.

For next season, in consequence of the increased price of cotton in the home and other markets abroad, the Department of Agriculture and Stock has decided to offer cotton-growers in Queensland 2d. per lb. for the next season's crop, under the same conditions as for this and the last crop. That is to say, that growers, instead of 1¾d. per lb., will receive an advance of 2d. per lb. on all cotton delivered at the State Ginnery, Brisbane, and at the close of the season's ginning, when the cotton is sold, will participate in all profits accruing after the expenses of ginning, baling, and marketing have been deducted. The effect of this advance in price will be that farmers will receive as much as, or possibly even more, for their cotton than they received in the palmy days of cotton-growing in Queensland during the American Civil War. Cotton seed, for September or October sowing, is supplied gratis by this Department.

# Entomology.

## THE SUGAR-CANE GRUB PEST.

The following "Notes on the Grub Pest" have been received from Dr. Illingworth by the General Superintendent of the Bureau of Sugar Experiment Stations. They are particularly interesting from the fact that they constitute Dr. Illingworth's first impressions, and secondly lay great stress on the benefit to be derived from cultural operations, especially the use of lime and green manure, the frequent use of which has been so long advocated by the Sugar Bureau:—

"Though we have been handicapped, to date, by a lack of transportation facilities, we have managed to get about somewhat, making observations with regard to the various factors determining the degree of grub-infestation, in the region about Gordonvale.

"The tremendous importance of the problem impresses one at once, upon viewing the great areas laid waste in districts like Meringa or Green Hills. Apparently there is no easy road to success in combating such a pest. Introduction of parasites would probably be of little avail, since we are here dealing with native insects. It is a well-understood fact that introduced parasites have only been used successfully against introduced pests. The fact of the matter is, we already find a number of parasitic and predaceous insects working against the grubs, but they are unable to show any marked results because they are themselves attacked by other parasites. There are, however, bacteria and parasitic fungi doing efficient work in some fields, especially under proper conditions of moisture, &c.; our excavations at Green Hills would indicate that approximately one-third of the grubs succumb to the attack of these organisms. We have not yet been able to determine how widely these friendly agents are distributed in the infested districts, but they certainly lend themselves to artificial propagation and transplanting, so that no field needs to be without them.

"In testing the soils of badly infested fields they were all found to be very poor in humus, and usually contained no lime—two factors which would appear to be of vital importance to the growth of sugar-cane in a grub district. First, the main food of the grubs is decomposing organic matter in the soil, which, if it is lacking, forces them to feed upon living roots of plants. Second, lime not only improves the character of the soil by hastening the humification of plant tissues, and making it possible for leguminous plants to store up a cheap and abundant supply of nitrogen, but its action is also very favourable to the development of the fungous parasites. It is a well-known fact that neither organisms of decay nor disease-forms will develop well in acid soils—*i.e.*, soils containing no lime.

"Apparently the general custom in all the grub-districts has been to destroy the principal humus-forming elements by burning all the trash, and failing to rotate cane with a green crop. So far we have only discovered one farmer who is working his land along the lines that science would suggest, and it is interesting to note that his farm, though originally rather poor land, is now among the best in the region about

Gordonvale; furthermore, he is not troubled with grubs, though the cane of near-by farms went down because of them. Moreover, this particular farm has better soil to-day than when it was opened up about twenty years ago. As to the treatment: The land was given a dressing of lime at the rate of about 1 ton per acre; a crop of beans was then turned under preparatory to planting cane. After two ratoons, and ploughing in all the trash, another crop of beans was worked into the soil, and in addition about 5 cwt. of meatworks manure per acre. This rotation has been followed up, with the result that our tests now show an abundant supply of humus. Recently, with the addition of about 2 cwt. of nitrate of soda per acre, this land has shown remarkable results. The crop is easily 50 per cent. better than that of an adjoining farm which was planted at the same time. I must not neglect to add that this farmer cultivates well, which is not only an important factor in plant development but may be shown to have considerable bearing upon grub control. This control would come about through the conservation of soil moisture, which would not only stimulate the growth of the cane, making it more resistant to the attacks of grubs, but the conserved moisture would also be of material assistance to the development of fungous organisms destructive to the grubs. These parasites cannot work in dry soil; hence, it is a well-recognised fact that grubs are more destructive in a dry season, or upon dry soils.

"The action of nitrate of soda or sulphate of ammonia is a marked stimulation of plant-growth and root-development, which makes the cane more resistant to the attack of grubs. Where there is a rapid renewing of roots as they are eaten off by grubs, the cane is able to hold its footing and does not go down before the winds. This point was well illustrated in one field that we visited—a part of which had been treated with about 2 cwt. of sulphate of ammonia per acre. The cane of part of the field was all down, while right to the line in the treated plot it stood erect and vigorous. The untreated portion could not be ratooned, because all the stools were too much out of the ground.

"As far as our observations have gone the indications are that high-lying fields are attacked worse than those on lower ground. This may be explained upon the grounds of weathering. Naturally, both humus and lime are leached out of high-lying soils, and tests show these soils to be very poor in both these elements.

"The use of arsenious poisons for the destruction of the grubs, as suggested by Mr. Jarvis, is very promising. Since we already know that they feed largely upon humus and decomposing soil substances, it would appear to be simply a matter of properly supplying and poisoning these organic bodies in the soil, preparatory to cane-planting. Fortunately, humus shows a marked affinity for arsenic, which has a defloculating action upon soil, making it more retentive to moisture. Chemical tests of certain soils of Hawaii, which have been treated with arsenic for the destruction of weeds for the past five years, show that all of the poison has remained in the top 4 inches of soil without injuring in any way the roots of the growing crop. If we can make use of arsenic as a weed-killer, and at the same time poison the food-supply of the grubs, it will certainly be a profitable procedure.

"Experiments are now being undertaken with 10 acres in one of the worst grub-areas on Meringa Farm, in order to test out the various suggestions as outlined above. This land is divided up into fifteen plots, from which we hope to get some conclusive results.

"It is rather early for us to make recommendations, but we should certainly say: 'Conserve the humus and apply lime'; later we may be able to suggest the best method of poisoning the grubs. In the meantime, make use of every known method of combating these terrible pests."

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## SUGAR-CANE PESTS.

The Bureau of Sugar Experiment Stations has received from Dr. Illingworth, the Entomologist at Gordonvale, the following report by the Assistant Entomologist, Mr. E. Jarvis:—

Work has recently been devoted principally to the study of the external anatomy and metamorphosis of certain of our more injurious cane beetles.

An illustrated treatise dealing with the habits and life-history of *Lepidiota frenchi Black* was prepared, and submitted to the Bureau of Sugar Stations.

I may state that the manuscript in question embodies an account of the egg and early larval instars—hitherto unknown to science—together with a technical description of the imago stage: while noteworthy specific structural differences between this insect and a closely related cane beetle (*Lepidiota*, No. 683) are also discussed and figured where necessary.

I wish to record the occurrence at Gordonvale last May of a new lepidopterous pest of minor importance affecting sugar-cane. The insect in question is a pretty hesperid butterfly named *Padraona hypometoma Lower*, a detailed description of which has been published by Lower (Revision of Australian Hesperidæ, Trans. Royal Soc. South Aust., Vol. XXXV., 1911), who records its previous occurrence at Herberton and Kuranda in March, and near Sydney in April.

At Gordonvale this butterfly was noticed eating the leaves of young cane plants growing in pots placed on a verandah at the laboratory. Although measuring scarcely an inch in expanse, its dark-brown wings contrasted with rich orange-yellow render it a fairly conspicuous insect, the latter colour being arranged in the form of an oblique stripe near outer margin of fore wing, and a large triangular blotch on costa of same, while a broad transverse band placed below two spots crosses the middle of the hind wing.

The pupa, which is about 5/8 of an inch long, is pale brownish-yellow with a dull red U-shaped plate on dorsal surface of anal segment, bearing two very short pointed horns, that part of its edge lying between them being scalloped, and the extremity of the anal segment flattened vertically and furnished with numerous yellow bristles.

This is the fourth species of Hesperidæ found attacking cane near Gordonvale, the other three—two of which occur also on sugar-cane in Java—being recorded in Bulletin No. 3 of this office (p. 22-25).

Since its publication, however, an additional butterfly (*Melanitis leda Lain.*) and a moth (*Mocis frugalis Fab.*) have been mentioned in monthly reports as occasionally destructive to the foliage of cane plants, so that our list of cane pests now includes sixteen lepidopterous insects.

# General Notes.

## NEW BOOKS.

We are in receipt of two books which should prove of much value to inexperienced, and even to experienced, men engaged in bush work, such as timber-getting and hauling, and in general forestry work. The contents of "A Hand Book for Rangers and Woodsmen" should be especially useful to Crown Land Rangers in this State, allowing for certain modifications in the matter of camp equipment, such as clothing, saddlery, provisions, &c., the details of which are more applicable to travel and camping out in the climate of North America than to the genial sub-tropical climate of Australia. Construction work is admirably dealt with, and the notes on this subject, especially in the matter of fencing of various descriptions, are of great interest to our bush workers. Other subjects ably dealt with are "The Care of Horses," "Identification of Live Stock," "Rope Fastening and Knots." There is a vast amount of valuable information in this book of 420 pages. Explanations of the various subjects treated are clear and intelligible, and the book is rendered of further value by the profuse illustrations. It is the work of a practical American forester, Mr. Jay L. B. Taylor, Forest Ranger, United States Forest Service. The book is well worth the price, 11s. 6d. The publishers are Messrs. Chapman and Hall, Limited, London.

The second book is said by the author, J. Arden Ferguson, A.M., M.F., Professor of Forestry at the Pennsylvania State College, U.S.A., to be an outgrowth of lectures given to agricultural students on "Farm Forestry" throughout several years, and is written for study by students of Agricultural Colleges and in High Schools. The denudation of our forests of hard and soft woods in Queensland, which has been going on for the past sixty years, without any attempt in the past to keep up the supply of our most valuable timbers, such as red cedar, beech, pine, silky oak, &c., as well as our splendid hardwods of the eucalyptus family, gives rise to the serious question of how to replace these timbers. The Forestry Department of the State is to-day fully alive to the necessity for forest reserves and for supplying, by tree-planting, the yearly deficiency. As Mr. Ferguson says, "Farm Forestry is a branch of the general subject of forestry, and aims to grow a crop of forest trees where it is impossible to utilise the land for other and more valuable purposes; thus forestry and agriculture go hand in hand in the use of all the land on the farm. The book deals with the natural methods of starting and reproducing a woodlot; with caring for the growing trees, protection and management; harvesting the products, contents of logs and trees; estimating the trees in the woodlot for board feet and cordwood, the use of perishable woods for fence posts, and how to treat them; and concludes with a suggested

list of practicum exercises that could be given in connection with a course in farm forestry. From beginning to end the book is highly interesting, and, if applied to forestry in Queensland, should be instrumental in inducing many farmers, part of whose land is unsuitable for general crops, to plant various trees which would be a valuable legacy to posterity. The price of this valuable addition to the literature of forestry is only 6s. The publishers are Messrs. Chapman and Hall, Covent Garden, London.

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Department of Agriculture and Stock,
Brisbane, 20th July, 1917.

## BURSARIES, QUEENSLAND AGRICULTURAL COLLEGE.

An examination will be held on the 18th and 19th December next in Brisbane and elsewhere, as may be decided upon, according to the localities where the candidates reside, for four bursaries at the Queensland Agricultural College. These entitle the holders to free board and instruction as resident students, and are tenable during good behaviour and the pleasure of Parliament for a period of three years. Candidates must not be less than sixteen or more than eighteen years of age on the 1st January, 1918.

Application for examination must reach the Under Secretary for Agriculture and Stock, Brisbane, not later than the 17th November next, and must be accompanied by (1) a certificate of birth; (2) proof that the applicant has resided for two years in Queensland, or that his parents have resided there for three years preceding the examination—this certificate to be attested by a magistrate; (3) a medical certificate that he is of sound constitution and in good health.

Past or present students at the Queensland Agricultural College will not be allowed to compete at this examination.

The examination will include English, mathematics, and nature knowledge, all on the standard and as outlined in the syllabus of the fifth class of the Queensland State schools.

In the event of two candidates receiving the same number of marks, the number of marks allotted to the examination in the elements of agriculture shall determine which candidate shall have the precedence, unless the Minister decides otherwise.

Unless the winner of a bursary takes up his residence at the college within one week after the commencement of the college year, he shall forfeit his right to a bursary. Except during the recognised vacations, the three years' residence at the college shall in every case be continuous, unless leave of absence for a specified period is granted by the Minister.

Further particulars on application to the Under Secretary.

WM. LENNON, Secretary for Agriculture and Stock.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR AUGUST, 1917.

| Article. | | AUGUST. Prices. |
|---|---|---|
| Bacon | lb. | 9d. to 1s. |
| Barley | bush. | 2s. to 2s. 6d. |
| Bran | ton | £5 15s. |
| Broom Millet | „ | £20 to £22 |
| Butter | cwt. | 158s. 8d. |
| Chaff, Mixed | ton | £4 10s. |
| Chaff, Oaten | „ | £7 |
| Chaff, Lucerne | „ | £4 to £7 |
| Chaff, Wheaten | „ | £3 15s. to £4 15s. |
| Cheese | lb. | 9½d. |
| Flour | ton | £12 |
| Hams | lb. | 1s. 3d. to 1s. 4d. |
| Hay, Oaten | ton | ... |
| Hay, Lucerne | „ | £3 10s. to £5 |
| Honey | lb. | ... |
| Maize | bush. | 3s. 2d. to 3s. 3d. |
| Oats | „ | 2s. 10d. to 3s. 9d. |
| Onions | ton | £17 to £18 |
| Peanuts | lb. | 3d. to 4d. |
| Pollard | ton | £6 10s. |
| Potatoes | „ | £8 to £11 |
| Potatoes (Sweet) | cwt. | 2s. 6d. |
| Pumpkins (Cattle) | ton | £2 |
| Eggs | doz. | 8d. to 9d. |
| Fowls | per pair | 3s. 3d. to 7s. 9d. |
| Ducks, English | „ | 3s. to 4s. |
| Ducks, Muscovy | „ | 4s. 9d. to 8s. 3d. |
| Geese | „ | 8s. to 9s. |
| Turkeys (Hens) | „ | 9s. to 9s. 6d. |
| Turkeys (Gobblers) | „ | 15s. to 18s. 6d. |
| Wheat | bush. | 3s. 6d. to 4s. |
| Hares | each | 3s. |

## VEGETABLES—TURBOT STREET MARKETS.

| | |
|---|---|
| Cabbages, per dozen | 2s. 6d. to 5s. 6d. |
| Cauliflowers, per dozen | 8s. to 11s. |
| Celery, per bundle | ... |
| Beans, per sugar bag | 6s. to 10s. |
| Peas, per sugar bag | 6s. to 13s. 3d. |
| Carrots, per dozen bunches | 1s. to 1s. 6d. |
| Chocos, per quarter-case | 2s. to 3s. |
| Beetroot, per dozen bunches | 8d. to 9d. |
| Lettuce, per dozen | 1s. to 2s. |
| Marrows, per sack | ... |
| Parsnips, per bundle | 7d. to 10d. |
| Rhubarb, per dozen bundles | ... |
| Sweet Potatoes, per sugar bag | 2s. 6d. |
| Table Pumpkins, per ton | £2 5s. |
| Tomatoes, per quarter-case | 2s. 6d. to 8s. 3d. |

## SOUTHERN FRUIT MARKETS.

| Article. | AUGUST. Prices. |
|---|---|
| Bananas (Queensland), per case | 9s. to 14s. |
| Bananas (Tweed River), per case | ... |
| Bananas (Fiji), per case | 4s. 6d. to 6s. |
| Bananas (G.M.), per bunch | 5s. 6d. to 7s. |
| Bananas (G.M.), per case | ... |
| Custard Apples, per twelve to fifteen tray | ... |
| Guavas, per case | 2s. to 4s. |
| Lemons (Local), per bushel-case | 2s. 6d. to 3s. 6d. |
| Mandarins, per case | 4s. to 5s. |
| Oranges (Navel), per case | 6s. to 14s. |
| Oranges (other), per case | 4s. to 5s. |
| Papaw Apples, per half-bushel-case | 1s. 6d. to 2s. |
| Passion Fruit, per half-case | 4s. |
| Persimmons, per half-case | ... |
| Pineapples (Queens), per double-case | 8s. to 13s. |
| Pineapples (Ripleys), per double-case | 7s. to 9s. |
| Pineapples (Common), per double-case | 6s. to 7s. |
| Tomatoes, half-bushel-case | 6s. to 10s. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | AUGUST. Prices. |
|---|---|
| Apples, Eating, per bushel case | 15s. to 16s. 6d. |
| Apples, Cooking, per bushel case | 10s. to 15s. |
| Bananas (Cavendish), per dozen | 1d. to 3½d. |
| Bananas (Sugar), per dozen | 2½d. to 3d. |
| Cape Gooseberries, per quarter-case | 6s. to 7s. 6d. |
| Citrons, per hundredweight | ... |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per quarter-case | ... |
| Custard Apples, per quarter-case | ... |
| Granadillas, per quarter-case | ... |
| Lemons (Lisbon), per quarter-case | 5s. to 6s. |
| Limes, per quarter-case | ... |
| Mandarins, per quarter-case | 7s. to 12s. |
| Oranges (Navel), per quarter-case | 9s. to 11s. |
| Oranges (Seville), per hundredweight | 10s. |
| Oranges (other), per case | 1s. 6d. to 3s. |
| Papaw Apples, per quarter-case | 1s. to 2s. 9d. |
| Passion Fruit, per quarter-case | 5s. to 8s. 3d. |
| Pears, per quarter-case | 8s. to 12s. |
| Peanuts, per lb. | 3d. to 4d. |
| Persimmons, per quarter-case | ... |
| Pineapples (Ripleys), per dozen | 10d. to 2s. |
| Pineapples (Rough), per dozen | 9d. to 2s. |
| Pineapples (Smooth), per dozen | 1s. to 2s. 3d. |
| Pomeloes, per hundredweight | ... |
| Quinces, per quarter-case | ... |
| Rosellas, per sugar bag | ... |
| Strawberries, per dozen boxes | 5s. to 17s. 6d. |
| Tomatoes, per quarter-case | 2s. to 7s. |

## TOP PRICES, ENOGGERA YARDS, JULY, 1917.

| Animal. | JULY. Prices. |
|---|---|
| Bullocks | £22 to £23 15s. |
| Cows | £16 5s. to £18 |
| Merino Wethers | 40s. |
| Crossbred Wethers | 47s. 3d. |
| Merino Ewes | 30s. 3d. |
| Crossbred Ewes | 47s. |
| Lambs | 37s. 6d. |
| Pigs (Porkers) | ... |

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JULY, 1917, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JULY, 1917 AND 1916, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | July. | No. of Years' Records. | July, 1917. | July, 1916. |
| *North Coast.* | In. | | In. | In. |
| Atherton | 0·82 | 15 | 0·30 | 2·68 |
| Cairns | 1·52 | 34 | Nil | 2·93 |
| Cardwell | 1·43 | 44 | 0·49 | 2·96 |
| Cooktown | 0·95 | 40 | 0·09 | 2·07 |
| Herberton | 0·5· | 29 | 0·22 | 3·03 |
| Ingham | 1·45 | 24 | 0·09 | 6·48 |
| Innisfail | 4·66 | 35 | 0·54 | 8·42 |
| Mossman | 1·18 | 5 | 0·02 | 2·60 |
| Townsville | 0·50 | 45 | Nil | 3·37 |
| *Central Coast.* | | | | |
| Ayr | 0·47 | 29 | Nil | 3·84 |
| Bowen | 0·93 | 45 | Nil | 2·70 |
| Charters Towers | 0·56 | 34 | Nil | 1·24 |
| Mackay | 1·59 | 45 | Nil | 5·22 |
| Proserpine | 0·88 | 13 | Nil | 4·20 |
| St. Lawrence | 1·25 | 45 | Nil | 3·09 |
| *South Coast.* | | | | |
| Biggenden | 1·27 | 17 | 0·65 | 3·26 |
| Bundaberg | 2·04 | 33 | 0·22 | 2·15 |
| Brisbane | 2·28 | 66 | 0·55 | 2·00 |
| Childers | 1·72 | 21 | 0·23 | 3·10 |
| Crohamhurst | 2·92 | 25 | 3·23 | 0·57 |
| Esk | 2·03 | 29 | 0·63 | 2·12 |
| Gayndah | 1·51 | 45 | 0·73 | 3·14 |
| Gympie | 2·17 | 46 | 1·14 | 3·46 |
| Glasshouse M'tains | 2·49 | 8 | 0·22 | 3·60 |
| Kilkivan | 1·75 | 37 | 0·85 | 3·19 |
| Maryborough | 2·01 | 45 | 0·53 | 2·79 |
| *South Coast—continued:* | | | | |
| Nambour | 2·75 | 20 | 0·36 | 3·41 |
| Nanango | 1·75 | 34 | 0·52 | 3·62 |
| Rockhampton | 1·47 | 29 | 0·41 | 2·68 |
| Woodford | 2·67 | 29 | 0·27 | 2·69 |
| *Darling Downs.* | | | | |
| Dalby | 1·84 | 46 | 0·67 | 2·50 |
| Emu Vale | 1·46 | 20 | 0·74 | 1·88 |
| Jimbour | 1·78 | 28 | 0·60 | 2·14 |
| Miles | 1·81 | 31 | 0·81 | 3·43 |
| Stanthorpe | 1·97 | 43 | 1·57 | 2·40 |
| Toowoomba | 2·05 | 44 | 0·47 | 2·29 |
| Warwick | 1·84 | 29 | 0·77 | 1·97 |
| *Maranoa.* | | | | |
| Roma | 1·43 | 42 | 0·23 | 2·56 |
| *State Farms, &c.* | | | | |
| Bungeworgorai | 1·02 | 5 | 0·14 | 2·75 |
| Gatton College | 1·42 | 17 | 0·40 | 1·57 |
| Gindie | 1·01 | 17 | 0·37 | 4·44 |
| Hermitage | 1·50 | 10 | 0·92 | 2·05 |
| Kairi | 0·99 | 4 | * | 2·51 |
| Kamerunga | 1·35 | 26 | 0·02 | 3·64 |
| Sugar Experiment Station, Mackay | 1·23 | 19 | Nil | 5·08 |
| Warren | 0·95 | 4 | 0·70 | 2·99 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for July this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

* Return not received.

GEORGE G. BOND, Divisional Officer.

# ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

## TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON.

| 1917. | SEPTEMBER. | | OCTOBER. | | NOVEMBER. | | DECEMBER. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·2 | 5·34 | 5·29 | 5·47 | 4·59 | 6·5 | 4·46 | 6·28 |
| 2 | 6·1 | 5·34 | 5·28 | 5·48 | 4·58 | 6·6 | 4·46 | 6·28 |
| 3 | 6·0 | 5·35 | 5·27 | 5·48 | 4·58 | 6·7 | 4·46 | 6·29 |
| 4 | 5·59 | 5·35 | 5·26 | 5·49 | 4·57 | 6·7 | 4·46 | 6·30 |
| 5 | 5·58 | 5·36 | 5·25 | 5·49 | 4·57 | 6·8 | 4·46 | 6·31 |
| 6 | 5·57 | 5·36 | 5·24 | 5·50 | 4·56 | 6·9 | 4·46 | 6·32 |
| 7 | 5·55 | 5·36 | 5·23 | 5·50 | 4·55 | 6·9 | 4·46 | 6·32 |
| 8 | 5·54 | 5·37 | 5·22 | 5·51 | 4·54 | 6·10 | 4·46 | 6·33 |
| 9 | 5·53 | 5·37 | 5·20 | 5·51 | 4·54 | 6·11 | 4·47 | 6·33 |
| 10 | 5·52 | 5·38 | 5·19 | 5·52 | 4·53 | 6·11 | 4·47 | 6·34 |
| 11 | 5·51 | 5·38 | 5·18 | 5·52 | 4·52 | 6·12 | 4·47 | 6·34 |
| 12 | 5·50 | 5·39 | 5·17 | 5·53 | 4·52 | 6·13 | 4·47 | 6·35 |
| 13 | 5·49 | 5·39 | 5·16 | 5·53 | 4·51 | 6·14 | 4·47 | 6·35 |
| 14 | 5·48 | 5·40 | 5·15 | 5·54 | 4·51 | 6·15 | 4·48 | 6·36 |
| 15 | 5·47 | 5·40 | 5.14 | 5·54 | 4·50 | 6·16 | 4·48 | 6·36 |
| 16 | 5·45 | 5·41 | 5·13 | 5·55 | 4·50 | 6·17 | 4·48 | 6·37 |
| 17 | 5·44 | 5·41 | 5·12 | 5·55 | 4·49 | 6·18 | 4·48 | 6·38 |
| 18 | 5·43 | 5·42 | 5·11 | 5·56 | 4·49 | 6·19 | 4·49 | 6·39 |
| 19 | 5·42 | 5·42 | 5·10 | 5·56 | 4·48 | 6·19 | 4·49 | 6·40 |
| 20 | 5·41 | 5·42 | 5.9 | 5·57 | 4·48 | 6·20 | 4·50 | 6·40 |
| 21 | 5·40 | 5·43 | 5·8 | 5·57 | 4·47 | 6·21 | 4·50 | 6·41 |
| 22 | 5·39 | 5·43 | 5·7 | 5·58 | 4·47 | 6·22 | 4·51 | 6·42 |
| 23 | 5·37 | 5·44 | 5·6 | 5·59 | 4·47 | 6·22 | 4·51 | 6·42 |
| 24 | 5·36 | 5·44 | 5·5 | 5·59 | 4·47 | 6·23 | 4·52 | 6·43 |
| 25 | 5·35 | 5·45 | 5·4 | 6·0 | 4·47 | 6·24 | 4·52 | 6·43 |
| 26 | 5·34 | 5·45 | 5·3 | 6·0 | 4·46 | 6·24 | 4·53 | 6·43 |
| 27 | 5·33 | 5·45 | 5·3 | 6·1 | 4·46 | 6·25 | 4·53 | 6·44 |
| 28 | 5·32 | 5·46 | 5·2 | 6·1 | 4·46 | 6·26 | 4·54 | 6·44 |
| 29 | 5·31 | 5·46 | 5·1 | 6·2 | 4·46 | 6·26 | 4·55 | 6·44 |
| 30 | 5·30 | 5·47 | 5·0 | 6·3 | 4·46 | 6·27 | 4·56 | 6·45 |
| 31 | ... | ... | 5·0 | 6·4 | 4·46 | ... | 4·57 | 6·45 |

The times given are for the whole of Queensland, New South Wales, and Victoria, where the same Standard Time is observed.

| | | H. | M. | |
|---|---|---|---|---|
| 1 Sept. | ○ Full Moon | 10 | 28 | p.m. |
| 8 „ | ☽ Last Quarter | 5 | 5 | „ |
| 16 „ | ● New Moon | 8 | 28 | „ |
| 24 „ | ☾ First Quarter | 3 | 41 | „ |

The Moon will be at its greatest distance from the earth at midnight on the 14th, and at its least distance on the night of the 30th.

| | | | | |
|---|---|---|---|---|
| 1 Oct. | ○ Full Moon | 6 | 31 | a.m. |
| 8 „ | ☽ Last Quarter | 6 | 14 | p.m. |
| 16 „ | ● New Moon | 12 | 41 | „ |
| 24 „ | ☾ First Quarter | 12 | 38 | a.m. |
| 30 „ | ○ Full Moon | 4 | 19 | p.m. |

The moon will be furthest from the earth on the 12th, and nearest to it on the 28th.

| | | | | |
|---|---|---|---|---|
| 7 Nov. | ☽ Last Quarter | 3 | 4 | a.m. |
| 15 „ | ● New Moon | 4 | 28 | „ |
| 22 „ | ☾ First Quarter | 8 | 29 | „ |
| 29 „ | ○ Full Moon | 4 | 41 | „ |

The Moon will be furthest from the earth on the 9th, and nearest to it on the 24th.

| | | | | |
|---|---|---|---|---|
| 7 Dec. | ☽ Last Quarter | 12 | 14 | a.m. |
| 14 „ | ● New Moon | 7 | 17 | p.m. |
| 21 „ | ☾ First Quarter | 4 | 7 | „ |
| 28 „ | ○ Full Moon | 7 | 52 | „ |

The Moon will cause an *Annular Eclipse* of the *Sun* on December 14th, but it will not be visible in Queensland. On the 28th there will be a *Total Eclipse* of the *Moon* between 7.38 and 7.55 p.m. It will be partly eclipsed for an hour and a-half before and after totality.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during September, October, and November, may be roughly arrived at by adding 16 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

# Orchard Notes for October.

## THE SOUTHERN COAST DISTRICTS.

As October is often a dry month throughout the greater part of the State, one of the most important duties of the fruit-grower is to keep his orchard or vineyard in a thorough state of cultivation, thus retaining the moisture in the soil that is essential to the setting and development of the fruit crop. As long as the land is level one cannot over-cultivate, as there is no danger of the soil washing, but when the orchard is on a hillside heavy thunderstorms, which may occur during the month, are very apt to cause heavy washaways of soil if the land is kept in the high state of tilth necessary to retain moisture. In this case the cultivation should always be across and not up and down the face of the hill, and where the soil is of such a nature that it will wash badly thin blocks, consisting of a row or two of a growing crop or of light timber, brushwood, or even a body of weeds or heavy mulching, should be provided, such blocks to follow the contour of the orchard. If dry, and water for irrigation is available, citrus trees will be the better for a thorough watering during the month. Give the trees a good soaking, and follow the irrigation by systematic cultivation, as this is much better than constant surface watering, as practised by the Chinese. Examine the orchard and vineyard carefully for pests of all kinds. When young trees are showing signs of scale insects, cyanide same; when leaf-eating insects of any kind are present, spray the plants that are being attacked with arsenate of lead. Look out carefully for black spot and oidium in grape vines, using Bordeaux mixture for the former and sulphur for the latter. When using sulphur, see that you get a fine sample—viz., one in which the particles of sulphur are in a very fine state, as the finer the sulphur the better the results. Do not apply the sulphur in the early morning, but during the heat of the day, as it is the sulphur fumes, not the sulphur, which do the good. A knapsack sulphurer is the best machine for applying sulphur to grape vines, trees, or plants.

Examine any late citrus fruits or early summer fruits for fruit-fly, and take every precaution to keep this great pest in check now, as, if fought systematically now, it will not do anything like the same amount of damage later on as if neglected and allowed to increase unchecked. October is a good month for planting pineapples and bananas. Be sure and have the land properly prepared prior to planting, especially in the case of pineapples, as the deeper the land is worked and the better the state of tilth to which the surface soil is reduced the better the results, as I am satisfied that few crops will pay better for the extra work involved than pines.

## THE TROPICAL COAST DISTRICTS.

As the fruit-fly usually becomes more numerous at this time of year, especial care must be taken to examine the fruit thoroughly prior to shipment, and to cull out all fruit that has been attacked by the fly. Banana

and pineapple plants may be set out, and the orchards should be kept well tilled so as to have the land clean and in good order before the heavy summer growth takes place.

All the spring crops of citrus fruits should be now marketed, and the trees, where necessary, should be pruned and sprayed, and the land be well ploughed. The ploughing should be followed by harrowing and cultivating, so as to get the surface of the land in good order. Granadillas and papaws should be shipped to the Southern markets, as, if care is taken in packing and they are sent in the cool chamber, they will carry in good order. These fruits should not be gathered in an immature condition, as, if so, they will never ripen up properly. They should be fully developed but not soft, and if gathered in this condition, carefully handled, and packed and shipped in cool storage, they will reach the Southern markets in good condition, and, once they become commonly known, will meet with a ready sale.

### THE SOUTHERN AND CENTRAL TABLELANDS.

In the Stanthorpe district the spraying of apple, pear, and quince trees for codling moth will have to be carefully carried out, the best spray being arsenate of lead, of which there are several reliable brands on the market.

When fungus diseases, such as powdery mildew, &c., are also present, Bordeaux mixture should be combined with the arsenical spray.

The vineyard will require considerable attention, as the vines must be carefully disbudded, and any signs of oidium or black spot should be checked at once. Look out for late spring frosts, and, if possible, try the effect of smudge fires producing dense smoke for preventing any damage.

Keep the orchards and vineyards well cultivated, as it is of the utmost importance to keep the moisture in the soil at this time of the year if a good fruit crop is to be secured.

In the warmer districts cultivation is all-important, and when irrigation is available it should be used for both fruit trees and vines, a thorough soaking followed by systematic cultivation being given.

## Farm and Garden Notes for October.

FIELD.—With the advent of warmer weather and the consequent increase in the soil temperature, weeds will make great headway if not checked; therefore our advice for last month holds good with even greater force for the coming month. Earth up any crops which may require it, and keep the soil loose among them. Sow maize, sorghum, setaria, imphee, prairie grass, panicum, pumpkins, melons, cucumbers, marrows. Plant

sweet potatoes, yams, peanuts, arrowroot, turmeric, chicory, and ginger. Coffee plants may be planted out. There are voluminous articles in previous journals giving full instructions how to manage coffee plants, from preparing the ground to harvesting the crop, to which our readers are referred. The planting of the sisal agave and the fourcroya may be proceeded with at any time of the year, but the best time is in spring and beginning of summer, when warm weather and good showers will enable the young plants to root quickly and become firmly established before the winter. The demand for the fibre is constantly increasing, and the supply does not nearly overtake the demand; hence prices keep high, and the outlook for the future is very promising. Plant only on dry or well-drained soil. Cotton may still be sown.

KITCHEN GARDEN.—Our notes for this month will not vary much from those for September. Sowings may be made of all kinds of vegetables. We would not, however, advise the sowing of cauliflowers, as the hot season fast approaching will have a bad effect on their flowering. French beans, including butter beans, may be sown in all parts of the State. Lima and Madagascar beans should also be sown. Sow the dwarf Lima beans in rows 3 ft. apart with 18 in. between the plants. The kitchen garden should be deeply dug, and the soil reduced to a fine tilth. Give the plants plenty of room, both in sowing and transplanting, otherwise the plants will be drawn and worthless. Thin out melon and cucumber plants. Give plenty of water and mulch tomato plants planted out last month. Asparagus beds will require plentiful watering and a good top-dressing of short manure. See our instructions in "Market Gardening," obtainable on application to the Under Secretary, Department of Agriculture and Stock. Rosella seeds may be sown this month. No farm should be without rosellas. They are easily grown, they bear heavily, they make an excellent preserve, and are infinitely preferable to the mulberry for puddings. The bark supplies a splendid tough fibre for tying up plants. The fruit also makes a delicious wine.

FLOWER GARDEN.—The flower garden will now be showing the result of the care bestowed upon it during the past two months. The principal work to be done this month is the raking and stirring of the beds, staking, shading, and watering. Annuals may be sown as directed for last month. Plant chrysanthemums, gladiolus and other bulbs, such as tuberose, crinum, ismene, amaryllis, pancratium, hermocallis, hippeastrum, dahlias, &c. Water seedlings well after planting, and shade for a few days. Roses should now be in full bloom. Keep free from aphis, and cut off all spent flowers. Get the lawn-mower out and keep the grass down. Hoe the borders well, and trim the grass edges.

QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## COTTON CULTIVATION IN QUEENSLAND.

BY A. J. BOYD.

The following notes on cotton-growing in this State are based on actual experience of many years during which the industry has been carried on more or less vigorously both inland and on the coast lands of the State, which is favourably situated in the latitudes especially suited for the successful raising of cotton crops south of the Equator. The great cotton-growing districts of the world all lie within a certain zone, beyond which cotton cultivation has not proved profitable. This belt is comprised between latitudes 36 degrees north and 36 degrees south of the Equator. Queensland lies entirely within the southern limits, and is therefore eminently designed by Nature for cotton-growing. It will easily be understood that even in this favourable zone there are large areas unsuitable for cotton-growing—such as high tablelands, pure sandy tracts, swamp lands, or localities subject to sudden variations of temperature. Cotton loves a warm temperature; and where this is found combined with a moderate rainfall, there the plant will reach the greatest perfection. The Uplands cottons can also withstand long spells of dry weather; but the Sea Island variety demands a moisture in the atmosphere, which it only finds in the tropical portions of the State—say, northward from Mackay. Such are the climatic conditions to be sought by the cotton-planter.

## CHOICE OF SOIL.

This is the most important matter to the cotton-grower. Whilst the plant will *grow* on almost any soil, it does not follow that it will be *productive* on each. The soil on which cotton thrives best need not be of the richest description, but neither may it be deficient in the special food needed by this crop. Some of our richest maize and sugar soils have yielded very indifferent cotton crops, while poorer soils, under exactly the same climatic conditions, gave handsome returns. In choosing a soil, therefore, for cotton-growing, a deep sandy loam, not too rich in humus, should be preferred to a heavy rich black soil. Heavy clay soils should be avoided, as they are more difficult and expensive to work. Stagnant water is one of the worst enemies to the cotton plant. What is required to ensure a good crop is a free soil, with good drainage, enabling the plants to obtain all the moisture they need whilst, at the same time, the superfluous water drains away. The cotton plant sends a long tap root into the ground, and it is this which enables it to thrive in continued dry weather. The preparation of the soil for a crop consists in ploughing and cross-ploughing as deeply as possible. Deep ploughing increases the water-holding capacity of the soil, and it also helps to mix the soil by quickly softening the more friable portions and allowing them to percolate into the cracks made by the ploughing process. It also permits the wind, water, air, sunlight, earthworms, bacteria, and other plant, animal, and mineral agencies to better perform their work of soil-building.

## SOWING THE SEED.

In the old days of cotton-growing in Queensland, cotton was often sown in rows 6 ft. apart, with the plants 3 to 4 ft. apart in the rows. Such distances are now deemed excessive, except in the case of the Wide-spreading Sea Island varieties, or the Caravonica, grown at Cairns, which is planted in rows 7½ ft. apart and almost the same distance between the plants in the rows. Then, and up to the present day, the Upland cotton, both in the Southern and Central districts of the State, was considered to succeed best in rows from 3 ft. to 4 ft. apart, the plants being from 18 in. to 2 ft. apart in the rows in light soils, and 4 ft. by 2 ft. on richer land.

## SPACING OF COTTON TO GET THE BIGGEST YIELD.

For years there has been a difference of opinion amongst cotton-growers all over the world on the spacing of cotton to obtain the greatest yield. The experience of to-day is that, generally, cotton gives the greatest yield when planted in close spacing. Exhaustive experiments to decide this question of spacing were made of late (1916) at three Mississippi Experiment Stations in the United States of America. The results showed that on land of moderate fertility, 3½-ft. rows with the plants spaced 12 in. apart in the drills, the yield was 1,632 lb. of seed cotton per acre. At 16 in. in the drills and 4 ft. between the rows, the highest yield was 1,274 lb. of seed cotton per acre.

The conclusion is that with the earlier dwarf varieties of Upland cotton, close spacing gives the highest yields.

## THE NEW SYSTEM OF COTTON CULTIVATION.

The system here described and recommended, has been tested in the United States both by the Department of Agriculture and by practical farmers. It is this:—To secure an early short-season crop of cotton, thin the plants later and leave them closer together in the rows than is now customary. Keeping the plants closer together during the early stages of growth restricts the formation of vegetative branches, and induces an earlier development of fruiting branches. So long as the plants are close together, they do not form these vegetative branches; hence, by thinning them when the stalks have grown beyond the stage where these useless vegetative branches are produced, the latter are almost entirely suppressed.

This makes it possible to leave more plants in the rows than is now customary, and yet avoid injurious crowding.

### THE BEST TIME TO SOW

in the South is from the latter end of August to October, November is rather late; but full crops have been gathered from November sowings, principally in districts where frosts only occur late in June or July.

### PICKING.

Picking will begin for early-sown cotton about January or February, and for November sowing about March or April; and will continue until the frosts of July and August cut down the plant.

There are still people who hold the belief that black labour is required for getting off the crop. No such labour is needed, nor has it ever been employed, except in the very early days of the pioneer companies in the Southern portion of Queensland, where almost all the cotton exported was then produced. From first to last, cotton is a white man's crop. As soon as the bolls begin to open, they should be allowed to fully expose the cotton, which should be full and dry before being picked; and then the work should be taken in hand at once; otherwise the cotton will become somewhat discoloured by exposure to sun, rain, and dew. Cotton-picking is a far less laborious work than picking strawberries or Cape gooseberries. If the plants have been properly grown, the picker has scarcely got to stoop. With a full crop, young boys or girls of from fourteen to fifteen years of age can easily pick 100 lb. of cotton a day, and experienced pickers can pick with both hands. Under favourable circumstances in the height of the season, smart pickers can pick from 150 to 200 lb. in a day. Picking should not be begun until the dew has completely dried off the bolls, so that a day's work means from about 9 or 10 o'clock in the morning until 5 o'clock in the afternoon, including the dinner interval. When the crop is in full swing about January and February—*i.e.*, when the trees are loaded with fully-burst bolls, from which the cotton comes away easily at a light pull of two fingers and the thumb—six people of a family can pick at least 600 lb. a day, and usually much more. Suppose that a farmer has 10 acres under cotton, and, at a low estimate, has a 1,000-lb. crop, he

will have 10,000 lb. to pick. Then, if only 500 lb. are picked daily, the whole crop is gathered in twenty days. But at the first picking there will not be such an exuberance of open bolls; neither will there be full pickings towards the end of the season. Then wet days and necessary work on the farm must be taken into consideration. Given, however, a month, or six weeks even, in which to gather the whole crop, it will be seen that 10 acres can easily be managed by one small family besides paying attention to other crops.

## PICKING BY HIRED LABOUR.

Advocates of cotton-growing are frequently confronted by the opinion that the cost of picking by hired labour would be a bar to the success of the industry. This is not borne out by facts, as the high wages now ruling for rural workers have not had the effect of reducing the area planted with cotton, but rather the reverse.

When the cotton is picked, it should be taken to the barn or storehouse, and all bits of leaves, sticks, and damaged or immature cotton should be taken out. A process called "whipping" makes this work easy. It consists in throwing the cotton on to a wire-netted frame (⅝-in.). This gets rid of all sand, soil, stones, &c., which may be adhering to the fibre. Carelessness in this respect results in a charge of 1s. per 100 lb. for whipping by the ginner.

## COST OF COTTON-GROWING.

The net return to the growers of the 1915-1916 crop was £7 14s. 9d. per acre.

The amount of seed required per acre ranges from 5 lb. to 10 lb.; and the Department supplies all applicants with the maximum of 10 lb. per acre, thus making allowance for misses, due to possibly defective seed or unfavourable weather conditions. It should be noted that the seed drills should not be deeper than 3 in., and that the land before sowing should be perfectly clean and in fine tilth; also, that after sowing it be kept perfectly clean, as the growth of the plants will be materially checked if they are smothered with weeds.

## THE BEST VARIETIES TO SOW.

In Southern Queensland, the Uplands varieties produce the largest crops. Amongst the best are Russell's Big Boll, Durango, and Jones' Hybrid. The Durango was lately imported from the United States, and has proved a heavy bearer, as did also Russell's Big Boll.

For Tropical Queensland, Sea Island and Caravonica are profitable, but only on the coast, as they require much saline atmospherical moisture.

These cottons also require wider spacing owing to their spreading habit, and should not be planted closer than 7 ft. between the rows and 7 ft. between the plants in the drills. This necessitates topping and pruning.

## INLAND LOCALITIES.

So far, the planting of cotton on the coast lands only has been dealt with; but it must not therefore be inferred that the plant will not succeed far inland. Splendid cotton has been produced in the inland Central District, as well as on the Southern and Western Railway Line beyond Toowoomba, also at Thargomindah and Barcaldine.

## SUMMARY.

(1.) Uplands cotton will succeed to perfection in the Southern River Districts—such as Nerang, Coomera, Pimpama, Logan, Albert—and all along the coast to the extreme North. West Moreton has also been amongst the greatest cotton-growing districts in the past.

(2.) Cotton is a sun-loving plant. It does not demand a large amount of moisture, and general practice has shown that the necessary moisture is best supplied by deep cultivation of a fairly porous or well-drained soil.

(3.) The after cultivation of cotton is the same as that required for maize, mangolds, or any other crop on which machines can be used until the foliage prevents the passage of horses. Until then, the cotton crop must be kept thoroughly clean and the soil in good tilth.

(4.) The crop will come in about March, often earlier, and continue for three months at least.

(5.) Cotton is ready for picking when the bolls turn brown and burst open.

(6.) Picking should not begin in the morning until the dew has evaporated from the plant.

(7.) A man can pick 100 lb. of cotton a day, and, as the season advances, up to 200 lb.

(8.) The price paid for picking depends upon whether the grower does the picking with the help of his family, or hires outside labour for the work.

(9.) No black labour is required, even in Tropical Queensland. White pickers can do better than coloured men.

(10.) The lowest Queensland average crop is 1,000 lb. per acre; and under favourable circumstances 2,000 lb. and even more have been harvested.

(11.) One thousand pounds of seed cotton will yield from 300 lb. to 400 lb. of lint (ginned cotton).

(12.) An advance of 2d. per lb. for cotton in the seed will be made to growers who deliver their cotton to the State Ginnery during the next three seasons. When the cotton has been ginned and sold, all profit derived, after the ginning expenses have been paid, is divided amongst the growers in proportion to their supplies.

(13.) Comparing the returns from maize, wheat, and cotton, the final results are distinctly in favour of cotton. The expense of a cotton crop from seed time to harvest is far less than the expense of either cereal crop. Maize and wheat require to be threshed after pulling, husking, reaping, and binding. Cotton demands no outlay beyond the cost of picking; whilst cartage and bags are incident to all three crops.

(14.) When the cotton is picked, it should be exposed for a few hours to the sun, to extract any moisture which may be in it.

(15.) When the crop is finally gathered, cattle may be turned into the field, the exhausted cotton plant furnishing a quantity of nutritive fodder.

(16.) The cotton plant may be pruned, when the following crop will come in a month or more earlier; but, considering the cost of labour, it is more profitable to plough out the old plants and resow.

## DISEASES AND INSECT PESTS.

In the older cotton-growing countries there are several fungoid diseases and insect pests, few of which have ever appeared in the Queensland cotton fields. The worst enemy of the plant in this State is the boll-worm, which bores a hole into the immature boll and destroys the fibre. The dreaded boll weevil—which has cost the United States of America £14,000,000 in the attempt to eradicate it, but which still continues to ruin the cotton fields in that country—is unknown in Queensland; neither has the American red cotton stainer nor the leaf-eating cotton worm appeared. A brilliantly-coloured, shield-shaped bug, which is often seen on the opened bolls in Queensland, is practically harmless.

The best remedy against the boll-worm is to plant trap crops. The worm prefers maize to any other plant; and this gives the cotton-planter a means whereby he may protect his cotton from their depredations. The plan to adopt is as follows:—Between every 25 rows of cotton, 5 rows are left vacant, 1 of which is planted as soon as possible with early-maturing corn. When the ear silk appears, examination must be made for the eggs of the moth; and when these are removed and no more appear, the whole plant is cut down and may be fed to stock. Now plant 3 or more rows of corn, or alternate corn with cow-peas. The peas should come into full bloom at the time the corn is silking. This means that the peas must be planted when the corn has appeared above ground. The 3 rows of corn should be silking in December. Upon the ears of these corn plants a large number of eggs will be found; and these should be allowed to mature, in order to prevent the destruction of the natural enemies which are parasites on the eggs and worms. The hosts of worms are also cannibalistic and devour each other. No destruction

of these ears is recommended till the whole generation has been parasitised. The fifth and last row of maize is then planted to catch the eggs of the few moths which have matured, and these are destroyed by burning. The success of the trap crop depends entirely on having the corn in tassel in December; and it must be planted considerably later than the normal time of planting in spring.

## ENCOURAGEMENT OF COTTON-GROWING BY THE DEPARTMENT OF AGRICULTURE.

As far back as 1904, in consequence of a short crop of cotton in the United States of America, the Department imported cotton seed, and about 100 farmers in the Southern Districts availed themselves of the opportunity afforded them to obtain seed gratis. The results were highly satisfactory to those who took the trouble to carefully cultivate the crop, notwithstanding the drawback that much of the seed was not sown till December. No farmer received less than £5 per acre for his seed cotton, and some got as much as £16 per acre. The general average cash return amounted to £9 9s. per acre gross.

For the past two years the Department has distributed local and imported cotton seed to farmers, and in 1915 advanced to the growers 1½d. per lb. for their crop, and in 1916, 1¾d. per lb., these advances being subject to a further payment of all profits derived from the sale of lint and seed, after all expenses have been deducted. The result was, that growers of the 1915-1916 crop obtained a price of 2.54d. per lb. for their cotton in the seed. The amount of lint (ginned cotton) from the crop gathered in 1917 was approximately 33,000 lb., which was sold locally at 11d. per lb. The growers have received the advance and will also receive all profit accruing from the sale, less charges, bringing their return to probably 3½d. per lb. for their cotton in the seed. At the time of writing, the final results of the ginning were not available and can only be given approximately.

For the 1917-1918 crop, and for the ensuing two years, the advance will be 2d. per lb. for cotton in the seed.

The Department has done much to foster the industry, by erecting ginning machinery, undertaking all marketing and transport, importing seed of the best kinds, distributing it gratis to intending growers, publishing and distributing gratis to all prospective and present growers literature up to date on the whole business of cotton-growing, and generally entering into the business of once more establishing on a firm basis an industry which, in 1871, when the farmers had no such assistance, brought in £79,317 from 2,602,100 lb. of cotton exported—the produce of 12,963 acres.

Between the years 1866 and 1873, the quantity of cotton exported from Queensland amounted to 10,324,433 lb., of a value of £427,596; and this without any assistance such as is now afforded by the present Government.

## WHAT SOUTH AFRICA HAS TO SAY ABOUT COTTON CULTIVATION.

Mr. W. H. Scherffuis, M.S., Chief, Tobacco and Cotton Division, Union of South Africa, wrote as follows in the "South African Journal of Science" of December, 1916:—

"*Cotton as compared with Mealies* as a Drought Resister.*—It has been proved repeatedly that cotton is far superior to mealies as a drought resister. We have a number of instances on record where farmers planted a portion of their lands to mealies and a portion to cotton; the drought was so severe that the mealies came to nothing, while the cotton gave a fair yield of lint. Last May, I had a report from a farmer in the Waterburg district, who informed me that last season he planted 400 acres to mealies, and, on account of the severe drought, he reaped nothing. He had 2 acres planted to cotton, and he reaped 1½ tons of cotton. This farmer intends to plant 200 acres to cotton next season. I have had many similar cases reported. These results obtained by farmers verify results obtained at our experiment stations.

"I should like to make it clear, however, that the first few weeks after the seed is sown is a very critical period. The young plants must have a moist soil until they are well established, after which they will stand a lot of drought, and still recover to a considerable extent when the rains set in again.

"*Profits in Cotton Culture compared to those in Mealie Culture.*—The average yield of mealies per acre in South Africa is about four bags; placing the value at 10s. per bag will give a total profit of £2 per acre, or a net profit of about £1 per acre. A cotton crop of only 600 lb.† of seed cotton would give 200 lb. of lint; placing an average value of 6d. per lb. on it will give a gross profit of £5 per acre, and a net profit of approximately £2 10s., and there are still 400 lb. of seed left, which, if ground, make an excellent stock food. If a larger yield of mealies or cotton is obtained, the relative values will increase in about the same proportions as those given above.

"*Varieties Suited to South Africa.*—In the middle or bushveld, some of the American varieties, such as Cleveland, Bancroft, Pullnot, Russell's and Bohemian give the best results. In the low veld, where the soil is very fertile, and on portions of the coastal belt, such as Natal and Zululand, Cook's Long Staple, Nyassaland, Allen's, and Sunflower, have given the best returns. A new variety, Taylor's Long Silk Staple, is being bred at the Rustenburg Station; this variety has a beautiful long, silky staple, a scant foliage and upright trees, which are all points in its favour, but whether it is going to be superior to some of the old-established varieties we are not yet ready to state.

"All of the above varieties are annuals,‡ and should be resown every season. I have heard of a few instances where farmers have

* Mealies means maize.

† An average crop in Queensland is 1,000 lb. of seed cotton, and over 2,000 lb. have been harvested from an acre.

‡ The Caravonica which was evolved by Dr. Thomatis in Queensland is not an annual, and, like other tree cottons, is pruned with good results.—Ed. "Q.A.J."

ratooned (pruned or cut back) their cotton trees and left them over for the second season with good results, judging from their reports. When this is done the second crop of cotton usually yields a shorter and inferior lint. A perennial variety by the name of Caravonica has been tried in many parts of the Union, but the results have been very disappointing, especially in the interior. Our records show that a few farmers have been successful with it, particularly in humid coastal areas. Mr. Loffler, of Zululand, is reported to have obtained good results with this variety.

"*Does Cotton Impoverish the Soil?*—In theory, cotton could be grown continuously on the same soil, provided the stalks and seed are returned to the soil, as the lint is almost a pure hydrocarbon. In practice, we usually burn the stalks to prevent insects from harbouring in them during the winter, and the seeds seldom find their way back to the same land; therefore a rotation of crops is advisable, as it keeps the soil in a better physical and chemical condition. Cotton is the least exhaustive of soil fertility of most commercial crops grown in South Africa; for example, cotton requires in fertilising elements approximately two-thirds as much as wheat, one-third as much as tobacco, and a quarter as much as mealies.

" In a series of fertiliser and rotation experiments we found that phosphates gave better results than either nitrogen or potash, but a complete fertiliser gave far better results than those obtained from the application of any one of the three elements. Similar results were obtained from tobacco, mealies, forage, and legumes, which indicated that the soils were deficient in phosphates."

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## THE COTTON OUTLOOK.

The American requirements for cotton for the coming season will be about 7½ million bales for the local mills, including linters and cotton used for munition purposes. It is apparent that the world's surplus of American cotton at the end of the season will be exceptionally small, and in view of American requirements, the supply outlook is a disconcerting one. As America will use 7½ million bales this season, this will only leave 5 million bales for the rest of the world. Whether the war continues another twelve months or not, there is every probability of a cotton shortage. The world's consumption is hardly likely to fall below 14,800,000 bales if the cotton can be obtained, although with the smaller acreage placed under cotton this season than last, and the admittedly poor start the cotton has obtained, a yield equal to the probable demand is unlikely. Cotton is in an undoubtedly strong position, and there seems no reason why a change should come about. In the middle of July last, "Middling" American was quoted in Liverpool at 19d. per lb., and " Fairly good" Egyptian, at 31.10d.—" Cotton," Manchester, July, 14.

# FARMERS' EXPERIMENT PLOTS IN THE CENTRAL DISTRICT.

G. B. BROOKS, Instructor in Agriculture.

## SORGHUMS.

An article was contributed to the "Journal" for October, 1916, giving the results obtained from the Grain or Dry District Sorghum experiment plots conducted in the southern district for that year, together with some general directions in regard to the culture of this crop.

It was intended to carry out similar tests in the Central District during the present year on a much more extensive scale, but on account of unforeseen circumstances arising through the war, only three plots, out of the twelve proposed, were arranged for.

As pointed out in the previous article, the main objective in growing this crop is to ascertain its grain-producing qualities in comparison with maize, which under the varying climatic conditions obtaining over most of our agricultural areas is a somewhat inconsistent yielder.

The 1916 season was favourable in this respect, for in localities where the maize crop failed on account of the absence of rain, yields as high as fifty bushels per acre were harvested from the grain sorghums, thus upholding their reputation as dry district grain-producers.

Fortunately, the 1917 season was an unusually moist one; therefore, further data in regard to their drought resistance could not be ascertained. Other important factors were, however, secured, such as the yield of grain and green material under moist conditions, and the effect of a wet season on the varieties having compact seed heads.

As the grain sorghums are also likely to be of some importance as fodder-producers, a comparison was made by including three fodder varieties in the test.

### LOCATION OF PLOTS.

Two were situated adjacent to the Dawson Valley Railway line, the other being at Capella, on the Clermont Railway line. The former is some 90 miles, and the latter 200 miles from the coast. One of the Dawson Valley plots was on the farm of Mr. F. Medlon, Deeford. The land was recently cleared brigalow scrub, the soil being of a brown loamy nature.

The other plot was on the farm of Mrs. M. Carnell, Wowan. This was forest land, adjacent to the Dee River; the soil being a sandy loam, rather inclined to bake.

The plot at Capella was sown on Mr. A. S. Bailey's property, the land being rolling downs country and the soil a dark loam.

### DATE OF PLANTING.

Sowing was carried out at the respective centres during the third week in December. The grain was planted in rows three feet apart, three to four pounds of seed being used per acre.

### CLIMATIC CONDITIONS.

No exact rainfall records were obtainable, but at each centre the amount of moisture was undoubtedly more than met the needs of the crop. During the period of growth the rainfall in the Dawson Valley was estimated at some 18 inches, while at Capella it was in the neighbourhood of 24 inches. It may be mentioned that the rainfall on several of the plots during 1916 did not exceed 4 inches.

### HARVESTING.

In the Dawson Valley the Amber and Saccharatum varieties were harvested during the first week in April, and other sorts a fortnight later. At Capella the respective varieties required a month longer to mature.

### YIELD.

The moist season was responsible for an exceptionally heavy growth of stalk. This fact is made apparent by the increased weights of green material secured, practically double that obtained during 1916.

[Accompanying the above are some very interesting graphs, one showing the variation and yield of grain obtained per acre in the respective districts, another gives the variation and yield of green material per acre, while the third shows the average yields obtained both in grain and green stuff for 1916 and 1917. It is regretted that owing to exigencies of space these graphs have to be omitted, as also those of Feterita at Wowan, Giant Honduras Sorghum at Mount Larcom, and a general view of the experiment plot at Deeford.]

### STUD PLOT.

In adidtion to the variety tests, a Stud plot, with "ear to row" test, was also arranged for on the farm of M. Carnell, Wowan, the variety grown being Standard Milo.

On account of the very favourable season, the growth was so rank as to cause lodging, making harvesting operations both tedious and difficult. The weight of green material was at the rate of 25·3 tons per acre, and the yield of grain 64 bushels. Unfortunately, the "ear to row" tests (10 in number) were so tangled up that the securing of reliable data was impossible.

### SELECTING STUD SEED.

In regard to fodder varieties, so far little attention has been paid to grain production. In securing seed for the 1917 plots, a selection was made from both a grain and fodder point of view.

This has undoubtedly been the means of very materially increasing the grain production of those sorts. The average yields for the fodder varieties for 1916 was 25·6 bushels per acre, while for 1917 this jumped to 52. The increase for the grain varieties was also a substantial one, the average for 1916 being 50·8, and for 1917, 70·2 bushels. In securing seed for the coming season's stud plots, and "ear to row" tests, the average weight of the ears selected shows a marked increase over those threshed out for the past season's (1917) operations. The following are

the average weights of the ears of the respective varieties selected both for 1916-17, and 1917-18:—

| Variety. | 1916-17. | 1917-18. | Heaviest Head in Selection—1917-18. |
|---|---|---|---|
| | Oz. | Oz. | Oz. |
| Crossbred. No. 1 Selection .. .. .. | 7·0 | 11·8 | 13·0 |
| ,, No. 2 Selection .. .. .. | .. | 10·0 | 10·5 |
| Giant Honduras .. .. .. .. | .. | 6·8 | 8·5 |
| Cream Milo .. .. .. .. .. | 4·8 | 5·9 | 7·5 |
| Feterita (Sudan Dhourd) .. .. .. | 4·0 | 5·6 | 6·8 |
| Planters' Friend .. .. .. .. | 3·0 | 5·1 | 6·8 |
| Standard Milo .. .. .. .. | 4·2 | 4·9 | 5·5 |
| B.H. Kaffir .. .. .. .. .. | 3·4 | 4·7 | 6·8 |
| Dwarf Milo .. .. .. .. .. | 4·2 | 4·9 | 5·0 |
| Shantung Dwarf .. .. .. .. | 3·2 | 3·6 | 4·0 |
| Saccharatum .. .. .. .. .. | 2·5 | 2·9 | 4·3 |
| Amber .. .. .. .. .. .. | 1·5 | 1·8 | 2·0 |

It will be noted from the above that the cross-breds selected have exceptionally heavy seed heads, thus giving much promise in regard to increased grain production. Several undesirable features will no doubt have to be guarded against, such as spreading habit, late maturing, astringent grain.

Cross-bred plants producing white grain is somewhat unusual, the colour invariably being from a light to dark red, somewhat similar in appearance to Standard Milo. There is a wide variation in the colour of the hull; in some plants it is a light grey, in others amber, while a glossy black is not uncommon.

The photographs on page 197 show different types of cross-bred heads and the relative size between them and a large head of the Cream Milo variety. The measure lying between Nos. 3 and 4 is 1 foot in length.

## ADVERSE FACTORS.

The quality of the grain was not affected in any way by the heavy rains, but in the districts more adjacent to the coast the maize caterpillar did some damage to the high-yielding compact-headed varieties, more particularly the Cream and Standard Milos. Feterita was affected to some extent, and to a lesser degree B. H. Kaffir. In the Emerald District (Capella and Gindie) the pest was not much in evidence. Its attack on the maize crop was in several localities also much more severe this season than is usual. In the event of its recurrence the breeding of heavy yielding varieties, with a more open seed head, which is less liable to attack, may have to be considered. It may also be desirable, in view of the fact that this crop is likely to be raised largely for grain production, to give more attention to the propagation and improvement of high-yielding dwarf sorts.

A number of sorghum varieties, including those experimented with, were grown during the past season at both the Warren and Gindie State Farms as an ensilage crop. Very heavy yields were obtained at both places. Mr. Burnage, manager of the Gindie Farm, stated recently that he had already secured two heavy cuttings from his sorghum paddock, and had hopes of getting another within twelve months of planting, with further cuttings next season.

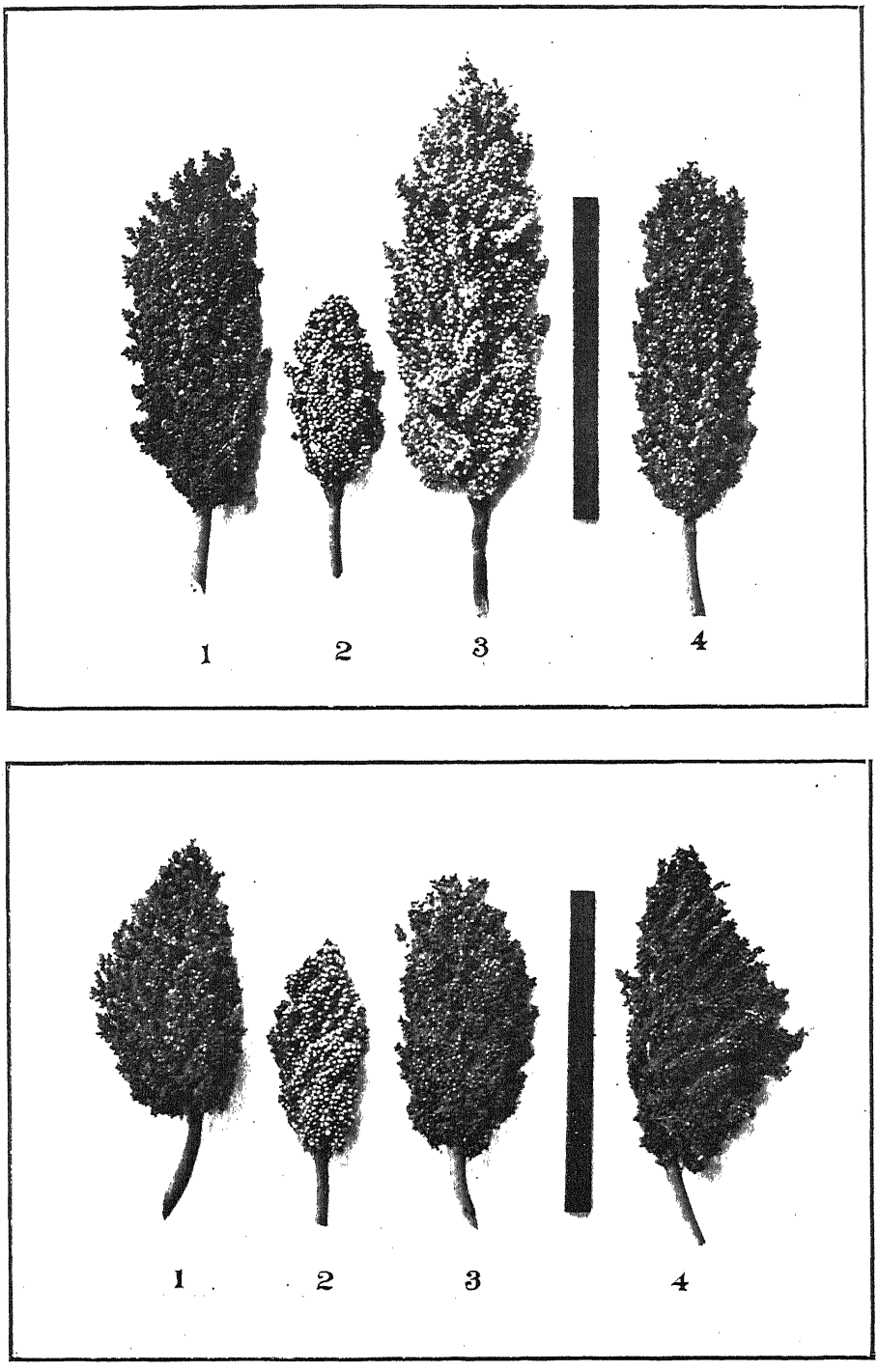



Plate 23.—Types of Cross-bred Heads.

## CORN-GROWING COMPETITION, 1917-18.

1. This competition will be open to all under the age of eighteen years who are residents of the State of Queensland. An entrance fee of 2s. 6d. must be forwarded to the Under Secretary with the application to enter.

2. Applications to be enrolled in the competition, containing the following particulars, must be forwarded to the Under Secretary, Department of Agriculture and Stock, Brisbane, to reach him, if possible, not later than 29th September, 1917:—

(*a*) Full name and address. (Give Christian names in full.)

(*b*) Date of birth. (Day, month, and year.)

(*c*) No. of Division in which applicant resides, and the name of the Dairy Inspector who supervises the locality.

3. The area to be devoted to the planting of the seed maize shall be one-tenth of an acre, selected seed for which, 1¼ lb. of Improved Yellow Dent, will be posted, free of cost.

4. Each competitor shall have absolute freedom in his choice of ground, and in the methods he may adopt in preparing, planting, and cultivating his plot; but in no case shall a plot exceed one-tenth of an acre. Yields will be calculated, when judging, on the basis of this area.

The following table shows the length the rows must be to give the exact area according as four, five, six or more rows are planted:—

| No. of Rows Four Feet Apart. | Length of Rows in Feet. | No. of Rows Four Feet Apart. | Length of Rows in Feet. |
|---|---|---|---|
| 4 | 272 ft. 3 ins. | 8 | 136 ft. 1½ ins. |
| 5 | 217 ft. 10 ins. | 12 | 90 ft. 9 ins. |
| 6 | 181 ft. 6 ins. | 16 | 68 ft. |
| 7 | 155 ft. 7 ins. | | |

5. Each competitor will be required to keep a record chart showing the dates and particulars of the different stages of work, and these charts must be delivered, at the time of harvesting, to the officer appointed for superintending and verifying the yield, and this officer will post them on to Brisbane.

6. Within seven days from the verification of the yield from the crop, each competitor shall select, without aid from other persons, twelve uniform cobs of the maize from his crop, and forward them, with a letter of advice, to the Department of Agriculture and Stock, Bris-

bane. (The cobs should be packed in straw envelopes, commonly used in packing beer bottles, and then placed tighly in a case which should be labelled and branded with the initials of the competitor and the number allotted to his district.)

7. Competitors must notify the Dairy Inspector for the district of the date when the crop shall have matured and be ready for inspection. *Unless this rule is observed the competitor will be disqualified.* The maize must be thoroughly dry and ripe when harvested.

8. No competitor shall be allowed to employ or permit any labour upon the competition plot standing in his name, other than his own personal labour, excepting in relation to the driving of horses, for which, owing to circumstances, such help may be needed.

9. The competition will close on the 30th June, 1918, and the prizes will be allotted thus:—

The competitors will be grouped according to the following divisions:—

(1) The district supervised by—
Mr. E. W. Ladewig, Dairy Inspector, Beenleigh.
Mr. H. C. Gordon, Dairy Inspector, Harrisville.
Mr. R. K. Henderson, Dairy Inspector, Rosewood.

(2) The district supervised by—
Mr. C. C. Pickering, Dairy Inspector, care of Miss Macpherson, Montague road, South Brisbane.
Mr. R. G. Ridgway, Dairy Inspector, Ellerslie Crescent, Taringa, Brisbane.
Mr. R. Winks, Dairy Inspector, Gympie.
Mr. J. A. Midgley, Dairy Inspector, Bundaberg.
Mr. W. S. Harding, Dairy Inspector, Esk.

(3) The district supervised by—
Mr. J. H. Barber, Dairy Inspector, Crow's Nest.
Mr. J. P. Carey, Dairy Inspector, Gatton.

(4) The district supervised by Mr. S. K. Crowther, Dairy Inspector, Kingaroy.

(5) The district supervised by—
Mr. J. J. Carew, Dairy Inspector, Russell street, Toowoomba.
Mr. L. Verney, Dairy Inspector, Newtown, Toowoomba.
Mr. J. R. D. Munro, Dairy Inspector, Warwick.

(6) The district supervised by Mr. D. Downs, Dairy Inspector, Gayndah.

(7) The district supervised by—
Mr. J. Cattanach, Dairy Inspector, Dalby.
Mr. R. S. Sigley, Dairy Inspector, Roma.
The Stock Inspector, Goondiwindi.

(8) The Central District of Queensland, including that supervised by Mr. L. Moriarty, Dairy Inspector, Rockhampton.

(9) The Northern district of Queensland, including that supervised by—
Mr. G. A. Smith, Dairy Inspector, Mackay.
Mr. S. A. Clayton, Dairy Inspector, Yungaburra.

10. Three special prizes of the value of £10, £5, and £3 will be awarded to the competitors who stand first, second, and third in the entire competition.

DISTRICT PRIZES.—1st, £5; 2nd, £2; 3rd, £1.

If there are less than six competitors, prizes will be allotted as follows:—

Four or five competitors (inclusive), two prizes, first and second.

Two or three competitors (inclusive), one prize only, first.

When only one competitor, he or she will be debarred from participating in the District Prize, but will be eligible to compete for the Special Prizes.

NOTE.—It is in the interest of the Entrants to encourage others to compete for the valuable prizes being offered.

No money prizes will be given, but each successful competitor will be allowed to select some article to the value of his prize.

No prize will be awarded unless the yield of corn equals twenty bushels per acre. This stipulation may be waived under very exceptional circumstances in the case of a lower yield.

11. The aggregate points will be 100, and the judging will be based upon the following:—

| | |
|---|---|
| (*a*) Yield of plot .. .. .. .. .. | 75 points |
| (*b*) Quality of maize produced .. .. .. | 15 points |
| (*c*) Notes and records of plot .. .. .. | 10 points |

12. The Director of Agriculture will be the sole judge of the competition, and his decision shall be final.

WILLIAM LENNON,
Secretary for Agriculture and Stock.

Brisbane, 3rd September, 1917.

# MARKET GARDENING.

## HERB-GROWING.

### BELLADONNA.

Amongst the herbs which might be profitably grown in the coast lands and high lands of Queensland where the autumn temperature does not rise much above 80 degrees F., is Belladonna, also called Dwale, or Deadly Nightshade (*Atropa Belladonna*), a tall, bushy herb of the natural order *Solanaceae*, growing to a height of 4 feet or 5 feet, having leaves of a dull-green colour, with a black shining berry fruit, about the size of a cherry, and a large, tapering root. The plant is a native of Central and Southern Europe. The entire plant is highly poisonous, and accidents have occurred through children and unwary persons eating the attractive-looking fruit. The leaves and roots are largely used in medicine, on which account the plant is cultivated, chiefly in South Germany, Switzerland, and France. Both roots and leaves contain the poisonous alkaloid Atropia. The percentage of Atropia in the roots ranges between 0.6 and 0.25, the roots of the young plants being always richest in the alkaloid. The percentage found in the leaves is much more uniform, being about 0.47, and extracts and tinctures of the leaves are therefore of much more constant strength than if prepared from roots.

#### The Uses of Belladonna.

Preparations of belladonna and atropia are used in medicine as anodynes in local nervous pains, and atropia is frequently hypodermically injected, but rarely taken inwardly. They are also of great value in ophthalmic practice on account of their peculiar property of producing dilatation of the pupil, either when painted around, or dropped into the eye. Belladonna is also used as an antispasmodic in whooping-cough and spasmodic coughs generally, and for various other medical purposes.

The following notes on the cultivation of the plant in California are published in Bulletin No. 275, December, 1916, University of California Press, Berkeley:—

"The soil on which the experiments were made consisted of a rich adobe and sedimentary loam, on which big crops of tomatoes had been grown for the two previous years. Seeding in the open proved a failure: seeds were therefore sown in cold frames, and they germinated in from six to over ten weeks. Although the temperature fell to below 27 degrees F. on two or three occasions, only some of the leaves of the young plants were killed, but the roots were unharmed. The plants were set out in the field in May, 1908, and in May, 1909, were ready for the first harvest. Owing to the dry, unfavourable season, the crop was light, and in July amounted to 355 lb. of perfectly dry and brittle belladonna from 1½ acres. A second crop was cut from plants of two seasons' growth, and brought the total, from 1½ acres, to 800 lb. of dry leaves and stems.

Although a shade plant, it thrives well in the open localities, having cool nights and considerable atmospheric moisture. Seedlings require abundant soil moisture, but when they are well rooted, soil moisture is not so essential.

Where the winter is not too severe, two, and perhaps three, crops can be gathered in one season. Extremely hot weather is harmful unless there is ample irrigation. A temperature which does not rise much above 80 degrees F. is best for the growth of the plants. Sunlight is even more important than temperature. Good, rich, well-tilled soil receiving 20 to 30 inches during the winter months, will ensure a good crop.

Belladonna is improved in yield by fertilisers. Lime appears to increase the alkaloidal content. The land should be ploughed to a depth of 9 inches, then crossed twice with the disc harrow.

The seeds may be obtained from America, but at the present war-time, not from Europe. The price per lb. is £1. The seeds are smaller than lucerne seeds. If kept in a dry place, they will retain their germinating power undiminished for three, and even four, years.

*Transplanting.*—Take up the seedlings. Cut off the dead tops and leave about 6 inches of the main root, with such side roots as may be present. In the field, cut a hole deep enough to receive root and crown, leaving only the dead stem remnant projecting above the surface of the soil. The crown part should be well covered, at least to the depth of an inch. Cover the roots and crown with fine soil, and tamp in the loose soil with the flat of the spade or hoe.

When transplanting the crown cuttings, the crowns are taken from the heeling-in bed and trimmed if necessary, the larger ones being cut into from two to five pieces. The smaller, single-rooted crowns are not divided. These cuttings are planted vertically and covered to a depth of three inches.

*Cultivation.*—Cultivation for the removal of weeds during the growing season depends, of course, upon the season and the growth of weeds. Certainly, no less than five or six cultivations should be made to keep the soil in good tilth, and as soon as the plants are large enough, the soil may be turned more and more towards the plants.

*Irrigation.*—As a general rule, irrigation is not required during the second, third, or fourth years.

*Harvesting.*—The herb is cut at the time of maximum flowering, at intervals between the first and second cutting, of three months. Heaps of four rows may be made if drying is done in the field. The stems should be cut at from 4 to 6 inches above the soil. It takes from five to six weeks for the herb to dry in the field, but a better plan is to leave the plants in the field for five or six days and then to dry them in a kiln at a temperature of about 120 degrees F.

If all the drying is done in the field, the heaps should be turned several times a week in the early morning before the leaves and small

branches have become brittle. When the leaves and all parts of the stem are brittle, they should be placed in a barn, where they should remain for another week or two preparatory to baling.

*Baling the Herb.*—When the herb is entirely dry, it is pressed into bales of 100 to 125 lb. each, either by means of a hand-power hay press, or by the usual horse-power. The bales are wired like hay or straw bales.

### HARVESTING THE ROOTS.

So far, we have dealt with the harvesting of the leaves and steams of the plant. At the end of the fourth season, immediately after the second crop of tops (herb) has been cut, the roots, with the crowns, are taken up, usually by a plough such as is used for ploughing up sugar beets. They are then hauled to the drying place where the crowns, with about 3 inches of root, are removed, and the roots cut into lengths of 4 or 5 inches. The larger roots are split longitudinally once or twice.

*Heeling-in the Crowns.*—An area of ground is levelled, the soil being then removed to a depth of several inches. Set in the crowns as closely as possible and cover with soil to a depth of 2 inches. Here they remain until transplanting time. They should be lightly watered to keep them from drying out.

*Drying the Roots.*—The clean cut and sliced roots are spread on a board floor or hurdles to dry in the sun or in the kiln. If sun-drying is done, they should be raked together each night, and covered to keep out moisture. Sun-drying will take from three to four weeks. Kiln-drying at 120 degrees F. is preferable. Dried roots are packed and shipped in boxes or in sacks.

Roots and crowns are taken up once every four years. Four-year roots are not of as high quality as third-year roots.

*Yield per acre.*—As with other crops, the yield is variable. The first season's crop (two cuttings of the herb) should be 1,800 lb. net, dry weight. The second season's crop should be 1 ton, and the third season should yield from 2,100 to 2,200 lb. dry weight. The fourth year should yield 2,200 lb. of the herb, and not less than 1,000 lb. of roots, both dry weight.

## THE BELLADONNA MARKET.

The demand for the dry herb, leaves, and root, is quite constant and is increasing every year. The United States requires about 300 tons of the drug annually. The European War has cut off the foreign supply almost completely, and as a result, the price has risen from about 12 cents (6d.) per lb. to one dollar (4s. 2d.) per lb. at wholesale.*

*The Wholesale Market.*—The grower should get in direct touch with the wholesale users of belladonna. There is no need of a middle man. One American manufacturing house uses over 80 tons of dried

* Belladonna was quoted in London in July, 1917, for leaves at 7s. 1d. per lb. wholesale.

drug every year. A grower should send samples (about 1 lb. of an average lot) to be submitted for chemical assay.

*The Retail Market.*—The retailers require leaves rather than stems, and it would not be possible to market hand-picked leaves profitably for less than 5s. per lb. (the present war-price is nearly 15s. per lb.).

### FIELD ENEMIES OF BELLADONNA.

The enemies of belladonna are few. Amongst them are the cut-worm, root-rot, aphis, squirrels and gophers (ground squirrels). The aphis made its appearance on plants grown in the shade. None have been found on sun-grown plants. Sunburn of leaves does very slight damage. A wilting and browning of the basal leaves is usually an indication that it is time to cut the crop.

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Mr. E. N. Ward, Superintendent of the Botanical Gardens, Sydney, in an article in the September issue of the "Agricultural Gazette" of New South Wales, describing a new drug plant (*Solandra longiflora*), which produces a valuable drug to which the name of "Solandrine" has been given, says—"It has the same active principles as 'atropine' which is produced from the leaves and roots of *Atropa belladonna*, or 'Deadly Nightshade.' But Atropa is difficult to grow in New South Wales, and it is a question whether, when it is grown, the leaves and roots when assayed for drug purposes will prove payable, for even in England, where the plant is largely grown, the uncultivated is preferable to the cultivated plant, whereas the Solandra will grow easily and quickly wherever West Indian plants will grow, which is almost anywhere inland and coastal where frost is not continuous and snow does not remain on the ground. The best method of propagation is by cuttings, for those root freely. The cuttings should be taken at the end of May from flowering 'wood,' just after flowering is over. The wood is then not too soft and not too hard. The cuttings should be put in nursery rows, in light, sandy soil, well drained, and when the ground where they are to be planted has begun to get warm in late spring they will be sufficiently rooted to plant out.

"When this new drug Solandrine becomes more widely known there will be a substantial demand for solandra leaves, and it will be a pity if growers of drug plants in New South Wales should be found still struggling with the cultivation difficulties, for belladonna leaves and roots will be largely superseded by the more valuable, and far more easily produced, *Solandra* leaves."

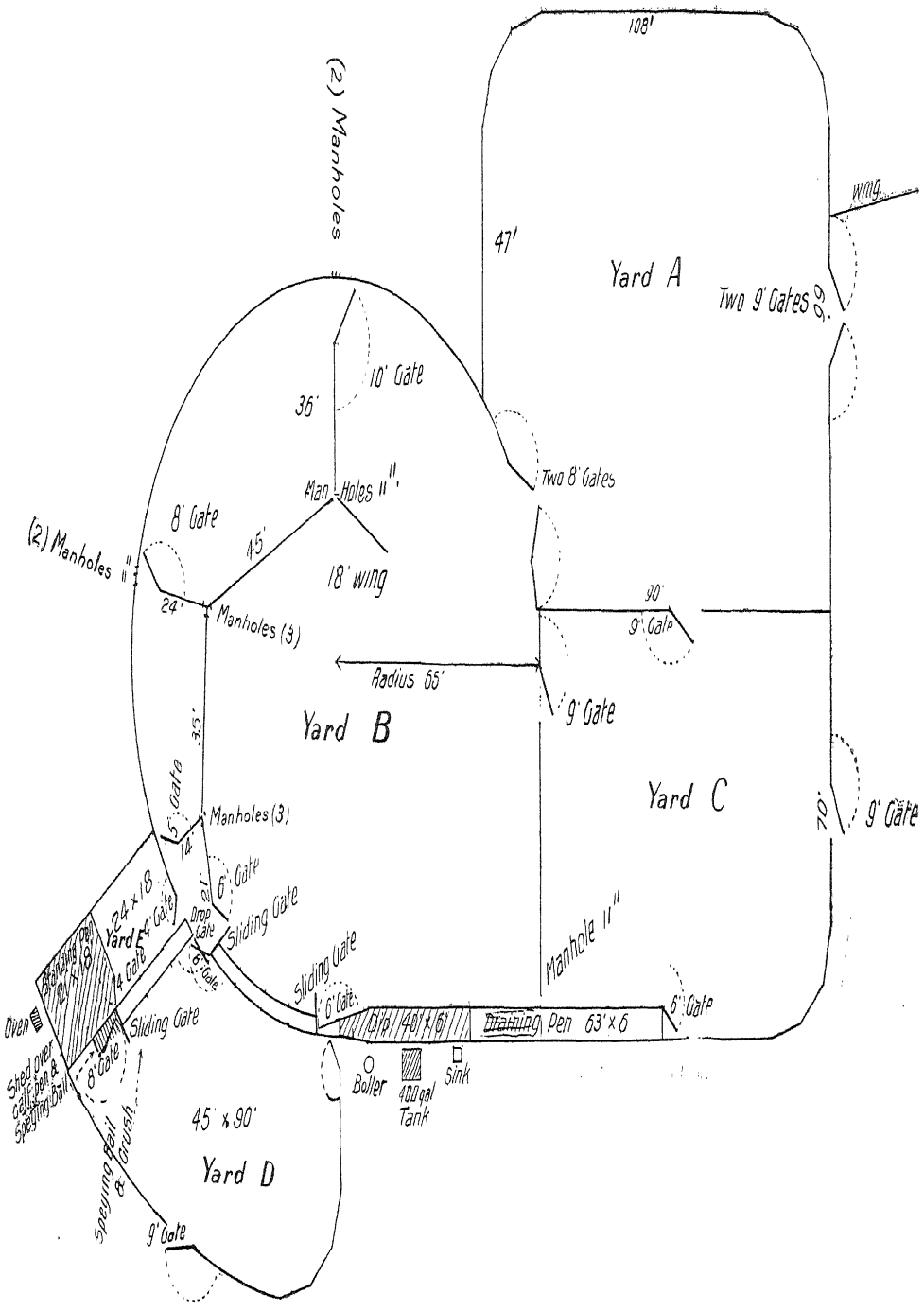
Mr. Ward mentions that by constant pruning it can be grown as a dwarf shrub, but if left unpruned it will make a rampant climber. One plant growing in Rose Bay at the foot of a Norfolk Island pine, 100 feet high, has grown to the top of this tree and flowers profusely from its branches. It is an accommodating plant, as it grows well in the driest and most hungry places, and does not appear to object to gross feeding. It makes an excellent hedge, but must not be planted where live stock can reach it, for it belongs to that most poisonous of plant families, *Solanaceæ*, and its tribe is Atropeæ.

# Pastoral.

## BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| P. Young .. .. | Talgai West, Ellinthorp | 2 | 42 | Milking Shorthorn Herd Book of Queensland |
| L. H. Paten .. .. | "Jeyendel," Calvert, S. & W. Line | 8 | 21 | Ayrshire Herd Book of Queensland |
| F. C. G. Gratton .. | "Towleston," Kingsthorpe | 2 | 14 | Holstein Cattle Club Herd Book |
| T. Mullen .. .. | "Norwood," Chelmer | 3 | 20 | Queensland Jersey Herd Book |
| J. H. Paten .. .. | Yandina .. .. | 6 | 21 | Ayrshire Herd Book of Queensland |
| Queensland Agricultural College | Gatton .. .. | 4 | 38 | Ayrshire Herd Book of Queensland |
| | | .. | 2 | Ayrshire Herd Book of Scotland |
| | | 2 | 9 | Holstein-Friesian Herd Book of Australia |
| | | 2 | 31 | Jersey Herd Book of Queensland |
| J. W. Paten .. .. | Wanora, Ipswich .. | 10 | 42 | Ayrshire Herd Book of Queensland |
| M. W. Doyle .. .. | Moggill .. .. | 4 | 12 | Queensland Jersey Herd Book |
| G. A. Buss .. .. | Bundaberg .. .. | 1 | 15 | Herd Book of the Jersey Cattle Society of Queensland |
| W. Rudd .. .. | Christmas Creek, Beaudesert | 2 | 10 | Milking Shorthorn Herd Book of Queensland |
| M. F. and R. C. Ramsay | Talgai, Clifton .. | 5 | 27 | Herd Book of the Jersey Cattle Society of Queensland |
| George Newman .. | Wyreema .. .. | 9 | 37 | Holstein-Friesian Herd Book of Australia |




GROUND PLAN OF CATTLE YARDS AND DIP FOR BRANDING, WEANING, SPEYING, INOCULATING, AND DIPPING; TO HOLD 800 HEAD.

When the Yards are only required for Dipping, Yards D and E are omitted. For Dipping small numbers of Dairy Cattle, Yards A and C may also be omitted.

Plan of Yards drawn by Mr. E. D. WHITE (of Messrs. W. D. White and Sons), Bluff Downs, Charters Towers, where there are Nine Dips and 22,000 Head of Cattle regularly Dipped.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| R. Conochie .. .. | Brooklands, Tingoora | 9 | 21 | Queensland Jersey Herd Book |
| W. J. Barnes .. .. | Cedar Grove .. | 10 | 37 | Queensland Jersey Herd Book |
| T. B. Murray-Prior .. | Maroon, Boonah .. | 2 | 37 | Queensland Shorthorn and Australian Herd Books |
| W. J. Affleck .. .. | Grasmere, N. Pine .. | 6 | 31 | Queensland Jersey Herd Book |
| A. J. McConnel .. | Dugandan, Boonah | 19 | 36 | Australian Hereford Herd Book |
| A. Pickels .. .. | Blackland's Stud Farm, Wondai | 4 | 62 | Illawarra Dairy Cattle Herd Book of Queensland |
| G. C. Clark .. .. | East Talgai, Ellinthorp | 3 | 7 | New Zealand Herd Book |
| H. D. B. Cox .. .. | Sydney (entered brother's name) | 3 | 16 | Commonwealth Standard Jersey Herd Book |
| J. T. Perrett and Son | Coolabunia .. .. | 2 | 36 | Illawarra Herd Book of Queensland |
| State Farm .. .. | Kairi .. .. | 4 | 8 | Ayrshire Herd Book of Queensland |
| | | 1 | 2 | Holstein-Friesian Herd Book of Australia |
| E. M. Lumley Hill .. | Bellevue House, Bellevue | 45 | 127 | Australian Hereford Herd Book |
| W. F. Savage .. .. | Ramsay .. .. | 1 | 12 | Illawarra Herd Book of Queensland |
| Tindal and Son .. | Gunyan, Inglewood | 50 | 400 | Australian Hereford Herd Book |
| J. N. Waugh and Son | Prairie Lawn, Nobby | 3 | 28 | Queensland Jersey Herd Book |
| J. H. Fairfax .. .. | Marinya, Cambooya (2) | 9 | 55 | Ayrshire Herd Book of Queensland |
| C. E. McDougall .. | Lyndhurst Stud, Warwick (2) | 25 | 100 | Queensland Shorthorn Herd Book |
| J. Holmes .. .. | "Longlands," Pittsworth | 6 | 20 | Ayrshire Herd Book of Queensland |
| P. Biddles .. .. | Home Park, Netherby | 1 | 20 | Illawarra Dairy Cattle Association |
| A. Rodgers .. .. | Torran's Vale, Lanefield | 1 | 9 | Milking Shorthorn Herd Book |
| R. S. Alexander .. | Glenlomond Farm, Coolumboola | 1 | .. | Holstein-Friesian Herd Book of Queensland |
| | | 2 | .. | Holstein-Friesian Herd Book of Australia |
| State Farm .. .. | Warren .. .. | 3 | 83 | Ayrshire Herd Book of Queensland |
| S. H. Hosking.. .. | Toogooloowah .. | 2 | 15 | Holstein Cattle Club Herd Book |
| W. J. H. Austin .. | Hadleigh Jersey Herd, Boonah | 1 | 2 | Queensland Jersey Herd Book |
| Ditto .. .. | ditto .. .. | .. | 6 | Commonwealth Standard Herd Book |
| H. M. Hart .. .. | Glen Heath Stud, Yalangur | 7 | 21 | Ayrshire Herd Book of Queensland |

## DIPPING CATTLE.

### OPINION OF AN EXPERIENCED CATTLEMAN ON AN UNFENCED HOLDING CARRYING 17,000 CATTLE AND WORKING EIGHT DIPS.

It is over twenty years since ticks first made their appearance on the Burdekin waters, when we lost up to 60 per cent. of our cattle from tick fever. Those that survived, and their progeny, became immune to the fever, and this immunity remains with the cattle on all country that continues to be badly infested with ticks. So there are practically no losses from fever now. But the extent of the loss we sustain annually through tick worry is not generally realised. Although most cattle stations now have dips, with very few exceptions, no systematic and methodical attempts have been made to deal effectively with this pest.

After ten years' trial here we can emphatically say that in badly infested areas no investment offers such a reliable and quick return as money spent on dips and dipping.

To gauge in some degree the extent of the loss we are sustaining, compare the number of cattle carried on these runs before and after the coming of the tick. The average now is about half of that formerly. Convert that into terms of money to realise the loss to the community and State.

It is impracticable at the present time to talk of eradication, because of the impossibility of getting financial aid from the State and the high cost of fencing. But the Americans have proved it possible by clearing 475,000 square miles between 1906, when the work was undertaken there seriously, up to March, 1916. This task must be faced by us later, and because the conditions we will have to work under may make this harder, it cannot be shelved indefinitely on that score.

However, what concerns us vitally in the meantime is the necessity of suppressing the ticks and doing away with much of the poverty and mortality to stock now being caused by them. To undertake this work each one making the attempt will very soon have his own experience to guide him, but a few suggestions may not come amiss to those about to start.

First, put in a good wide dip 6 feet across at water line. This reduces all risks of cattle injuring each other to a minimum and has every advantage over the narrow dip when working big mobs of cattle. With a good incline and big wide steps on the walk out, the weakest cattle can be dipped with little risk. The draining yard should be long and from 8 to 12 feet wide. The cattle walk to the far end and stand quietly without horning and knocking each other about. Dips should be arranged in such positions on the run so the cattle will not be driven more than 7 or 8 miles.

The number of cattle that can be worked through one dip depends entirely on the carrying capacity of any particular area. But on the Tableland, so far, we have found about 2,000 the limit without having to drive too far. How often cattle should be dipped depends upon the

nature of the country, for whereas on certain runs on the Upper and Lower Burdekin it is found necessary to dip every three weeks through the year, there are other places within the tick infested area that find an occasional dipping suffices. In this men must be guided by their own experience. It is a bad policy to wait until the hair is coming off the cattle. Taking this Tableland country, we find that after a good burning in the spring and rain following in November and December the ticks are not much in evidence until the following April. It is not possible to dip regularly during the first three months owing to wet weather, but by April the wet season is usually over. This is the time, and from this on to July one can get good results from dipping. This is the very best time to work stock. The grass is good, everything strong, and the weather cool, and the ticks, if unchecked, are increasing at a great rate. Don't delay until the country is infested; catch them early while the cattle are strong and healthy, and keep the ticks off and the condition on, and give the breeders a chance to weather a severe winter and dry spring. One dipping then is worth more than four in August.

It is often contended that the losses from dipping weak cattle outweigh any gain. Our experience is quite the reverse. We never stopped dipping all through the 1915 drought, and not ten head stopped in the dip. Each dipping gave them a new lease of life, and we saved most of our breeders by it. Others say it is impossible to dip bullocks while fattening. This is wrong. It not only quietens them and makes them better to drove, but improves their condition and weight. It is not advisable to put cattle on the road immediately after dipping. They should have at least five days' rest in paddocks. Calves can be dipped from two weeks of age upwards, but the strength of the dip should be less than the accepted standard, to avoid any risk of loss.

As to the extra cost dipping entails, though almost as much benefit can be derived from dipping on big unfenced runs, better results can naturally be obtained where they are subdivided and not more than 1,000 to 1,500 cattle carried in one paddock. This allows the mustering to be done cleanly and systematically. Where eight stockmen used to look after up to 20,000 clean cattle formerly with fair success it requires treble the hands, at least, to work and dip effectively that number now. Six men can attend to 3,000 or 4,000 head. Bullocks require about one-third the attention that breeders do. Where no shoeing of horses is done (which involves a big addition to the work on basalt country) this estimate may not apply.

Now to meet this big increase in working stock under these conditions: Allow we save half the cows that die on the average annually from tick worry. This mortality on the Tableland is about 80 per cent. of the total females branded each year. The balance of 20 per cent. (over

the actual number if returns were forthcoming) are those cows sold and killed for beef. On a holding branding 2,000 calves, instead of turning off 200 cows, which very few do in that proportion, they should be marketing at least 500. These extra 300 cows alone at present values would more than compensate for all extra expenditure incurred. Then take into consideration the holding would carry 50 per cent. more stock with all the additional returns for an increased turn off and better class of bullocks.

E. E. D. WHITE,
Bluff Downs.

## PURIFYING WATER FOR STOCK.

A simple method of purifying almost any water for drinking without boiling has been worked out by Dr. G. G. Naismith, director of the Health Laboratories of Toronto, Canada, and Dr. R. R. Graham, Assistant Chemist. The process is as follows:—Add a teaspoonful (not heaped up) of chloride of lime, containing about one-third available chlorine, to a cupful of water. Dissolve, and add in any convenient receptacle three more cupfuls of water. Stir and allow to stand for a few seconds in order to let the particles settle. This stock solution, if kept in a tightly stoppered bottle, may be used for five days. Add a teaspoonful to two gallons of water to be purified; stir thoroughly in order that the weak chlorine solution will come into contact with all the bacteria, and allow to stand for ten minutes. This will effectually destroy all typhoid and colon bacilli, or other dysentery producing bacilli in the water. The water will be without taste or odor, and the trace of free chlorine added rapidly disappears.

Water containing mud in suspension is easily clarified by dropping hot wood ashes into it, or by the application of lime or alum. These two substances make the water hard. Chloride of iron may also be used. It is quite harmless, and a valuable constituent for all animals. Medical men prescribe iron in one of its several forms as a tonic. One pound of chloride of iron (2d. per lb.) will clarify 1,000 to 2,500 gallons of muddy water, and much reduce the bacterial contents.

## MUSHROOM KETCHUP.

Put mushrooms into large earthenware basin, sprinkle with plenty of salt. You may keep adding mushrooms for two or three days, and sprinkle more salt over them. Boil mushrooms and their juice for half an hour, strain, and for each quart of juice add ½-pint of vinegar, 1 teaspoon black pepper, ¼-spoon cayenne, some peppercorns, tablespoon sugar, cloves, a little bruised whole ginger. Boil 1 hour. Strain again, and bottle while hot.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 28TH JULY TO 27TH AUGUST, 1917.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Auntie's Lass | Ayrshire ... ... | 5 July, 1917 | 1,239 | 4·0 | 58·2 | |
| College Damsel | Holstein ... ... | 12 July ,, | 1,127 | 3·9 | 51·58 | |
| Netherall Queen Kate | Ayrshire ... ... | 30 June ,, | 1,066 | 3·8 | 47·50 | |
| Lilia ... | ,, ... ... | 11 July ,, | 1,076 | 3·6 | 45·41 | |
| Lady Melba | Holstein ... ... | 14 Feb. ,, | 931 | 3·6 | 39·28 | |
| Confidence... | Ayrshire ... ... | 25 June ,, | 774 | 4·0 | 37·34 | |
| Lady Margaret | ,, ... ... | 6 Jan. ,, | 663 | 4·5 | 35·13 | |
| Miss Security | Jersey ... ... | 27 Mar. ,, | 611 | 4·7 | 33·85 | |
| Miss Bell ... | ,, ... ... | 27 June ,, | 563 | 4·6 | 30·51 | |
| Lady Prim... | Holstein ... ... | 3 Aug. ,, | 761 | 3·3 | 29·32 | |
| Netherton Belle | Ayrshire ... ... | 17 July ,, | 695 | 3·6 | 29·31 | |
| Princess Kate | ,, ... ... | 28 June ,, | 629 | 3·8 | 28·02 | |
| Lady Loch II. | ,, ... ... | 3 June ,, | 612 | 3·9 | 28·00 | |
| Buttercup ... | Shorthorn... ... | 2 June ,, | 685 | 3·4 | 27·20 | |
| College Bluebell | Jersey ... ... | 28 June ,, | 723 | 3·2 | 26·98 | |
| Glade ... | Shorthorn... ... | 29 Mar. ,, | 414 | 5·5 | 26·93 | |
| Sweet Meadows | Jersey ... ... | 8 Aug. ,, | 370 | 5·6 | 24·50 | |
| Hedges Madge | Holstein ... ... | 22 Mar. ,, | 551 | 3·7 | 23·88 | |
| Iron Plate ... | Jersey ... ... | 9 Dec., 1916 | 430 | 4·6 | 23·30 | |
| Rosine ... | Ayrshire ... ... | 21 June, 1917 | 557 | 3·1 | 20·12 | |

## EXPERIMENTS WITH PEPSIN TO REPLACE RENNET.

D. W. STEUART, B.Sc. (University College, Cardiff.)

In view of the shortage and high price of rennet, the Agricultural Department of University College, Cardiff, decided to give pepsin a trial. A London firm kindly sent 1 oz. of their 1-3,000 soluble pepsin powder for that purpose. From this it was desired to produce a solution which would be as similar as possible in composition and strength to standard rennet extract, which could be used in exactly the same way as rennet, and which would keep. A 10 oz. dark-coloured bottle (a "poison" bottle from the druggist's) was thoroughly washed and scalded, then allowed to cool, and the 1 oz. of pepsin powder put into it. Then 50 grammes of salt, 5 grammes of boric acid, and 250 grammes of water were brought to the boil in an Erlenmeyer flask (water and salt often contain germs, so this treatment was necessary.) The brine was cooled to 105 degrees F., put into the bottle, corked with a new cork, the whole

shaken violently, and then, without any preliminary filtering, sent to the dairy to be tested. Miss Annie Pritchard, N.D.D., reported as follows: The solution gave a 17-18-second rennet test as against 22 seconds with rennet extract. On standing a sediment settled. When shaken up for use the solution was very cloudy. The pepsin solution was tested against rennet on four different days for making Caerphilly cheese. The pepsin acted in about 7 minutes, and the curd was ready to cut in 45 minutes; the rennet acted in about 15 minutes and the curd was ready to cut in an hour. Even then the pepsin curd was always the firmer when cut. Taking the four tests together, 16½ gallons of milk gave 18 lb. 9 oz. of curd with rennet, but 19 lb. 11 oz. of curd with the pepsin. The pepsin curd was therefore moister, due to the curd being firmer when cut. What remained of this unfiltered pepsin solution at the end of two months gave even a quicker rennet test, proportionately, than when it was new, showing that it had become somewhat stronger.

The solution was examined bacteriologically at the end of the first month. To three Durham's tubes containing MacConkey's litmus, lactose, bile salt, and peptone water, 1 c.c., 1/10th c.c. and 1/100th c.c. of pepsin solution were added, respectively, and the tubes were incubated two days at blood heat. There was no evidence of gas-producing coliform organisms. Then similar quantities of the pepsin solution were added to tubes of whey agar, plates were poured, and incubated three days at 37 degrees C. Not a single colony of germs developed, suggesting that the solution was almost or quite sterile.

A second ounce of soluble pepsin powder was purchased for 1s. 9d., and made up as before, but in the following proportions: 1 oz. pepsin, 68 grammes salt, 7 grammes boric acid, and 340 grammes water.

The whole was shaken violently. Next day the shaking was repeated. On the second day the solution was filtered through filter paper. The filtering took about 24 hours. The fluid was bottled as before and sent to the dairy.

Miss Pritchard's report this time was to the effect that the solution was fairly clear and showed no sediment. It gave practically the same rennet test as the rennet. It was compared with rennet for making Caerphilly, Smallholder and soft cheeses (Bondons, Pont L'Evéques, and Coulommiers). The results were entirely satisfactory, the pepsin solution and rennet being of equal strength and having the same effect.

A pair of Caerphilly cheeses made on 20th February, each from 2 gallons of milk, were sampled on 8th March. The two cheeses differed in weight only by an ounce. There was practically no other difference between the pepsin and the rennet cheese. The first batch of Caerphilly cheeses was sold to Mr. Richard Thomson of the Direct Trading Company at 160s. per cwt., the then ruling price for first quality Caerphilly. On the 22nd of March, Mr. Thomson examined the cheeses and considered all of them to be entirely satisfactory. Three pairs of cheeses made on 28th February, 1st March, and 6th March, respectively, were selected, and it was explained how they differed. Mr. Thomson was unable to

detect any difference between the rennet cheese and the pepsin cheese of each pair.

The trials suggest that a gallon of rennet solution of standard strength can be made by mixing the following ingredients:—

13½ oz. of the firm's 1/3,000 soluble pepsin powder;
2 lb. salt;
3 oz. boric acid; and
1 gallon water.

The brine must be cooled to 104 degrees F., after boiling, before dissolving the pepsin. The solution may be filtered after a day or two. It will keep well. With pepsin at 22s. per lb., a gallon costs 18s. 6d. The makers claim that 1 oz. of pepsin powder will curdle 300 gallons of milk. This is quite correct. It takes 12 oz. of standard rennet extract to equal 1 oz. of pepsin powder.—"Journal of the Board of Agriculture," England.

## PICKLING ONIONS AND GHERKINS TO PRESERVE THEIR COLOUR.

The following methods for preserving the whiteness of pickling onions and the green colour of gherkins are described in the "Agricultural Gazette" of New South Wales of August 2:—"If the white colour that is appetising and attractive in pickled onions is to be retained, spices must be omitted. Choose the smallest onions which can be found, and, to facilitate the removal of their skins, pour hot water over them. Make enough strong brine to cover the onions, and put them into this as they are peeled. Let them remain there from one morning till the next; then replace this brine with fresh, and do the same on the third morning. On the fourth morning put the onions in fresh water, and heat them to the scalding point, stirring frequently. Milk addded to the water will help to whiten the onions during the boiling. Drain well, and place the onions in a jar, pouring scalding hot vinegar over them.

The first essential to success in pickle-making is good vinegar, strong and pungent. Do not use a copper vessel in any part of the process—a porcelain-lined preserving vessel is best. Vinegar boiled in a copper vessel forms acetate of copper, which is a poison.

To retain the green colour in gherkins, add parsley to the vinegar some days before it is required, and let it steep thus. The vinegar should acquire a decided green colour which will necessarily be imparted to the gherkins.

Take 200 gherkins, cover with cold water, to which a pint of salt has been added. Let them stand overnight. In the morning drain off this water, but measure how much is poured off. Then take a similar quantity of the prepared vinegar, add 1 oz. of whole cloves, 1 oz. of allspice, and a piece of alum the size of a walnut. Boil this vinegar and the spices, and pour it, boiling hot, over the gherkins. Cover with green cabbage leaves. A few green peppers in the vinegar give additional flavour and are a great improvement.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, AUGUST, 1917.

The month of August has been favourable for egg production, 9,375 eggs being the total for the month. In the light section, E. Chester's six pullets laid the highest monthly total of 149, but as the eggs are under weight, the monthly prize goes to C. Porter, with a total of 145 eggs. In the heavy section, E. A. Smith and A. E. Walters are equal for first place with 156 eggs each. R. Burns comes next with 151, G. Richter, C. C. Dennis, and Dr. E. C. Jennings have each had a bird treated for sickness. Broodiness has been rather prevalent amongst the heavy breeds in the group pens, but in one case only in the single heavy test. No case of broodiness has been recorded in any of the light-breed pens. Mr. R. Burns's F bird, competing in the single test, has put up the fine record of 143 eggs in 151 days, laying 77 eggs in the past 77 days, and is still in lay. This probably constitutes a record for continuous production. The following are the individual records:—

| Competitors. | Breed. | August. | Total. |
|---|---|---|---|
| | LIGHT BREEDS. | | |
| E. Chester ... ... ... ... ... | White Leghorns ... | 149 | 639 |
| *G. H. Turner ... ... ... ... | Do. ... ... | 132 | 563 |
| W. Becker... ... ... ... ... | Do. ... ... | 131 | 555 |
| G. Chester ... ... ... ... ... | Do. ... ... | 137 | 534 |
| F. W. Leney ... ... ... ... | Do. ... ... | 143 | 534 |
| C. Porter ... ... ... ... ... | Do. ... ... | 145 | 531 |
| W. R. Crust ... ... ... ... | Do. ... ... | 128 | 531 |
| T. A. Pettigrove, Victoria ... ... | Do. ... ... | 126 | 515 |
| Moritz Bros., S.A. ... ... ... | Do. ... ... | 135 | 514 |
| Oakland Poultry Farm ... ... ... | Do. ... ... | 116 | 514 |
| T. Taylor ... ... ... ... ... | Do. ... ... | 128 | 497 |
| *J. Zahl ... ... ... ... ... | Do. ... ... | 111 | 488 |
| T. B. Hawkins ... ... ... ... | Do. ... ... | 126 | 487 |
| *J. R. Wilson ... ... ... ... | Do. ... ... | 117 | 486 |
| *J. M. Manson ... ... ... ... | Do. ... ... | 127 | 483 |
| Kelvin Poultry Farm ... ... ... | Do. ... ... | 138 | 478 |
| J. G. Richter ... ... ... ... | Do. ... ... | 120 | 473 |
| Mars Poultry Farm ... ... ... | Do. ... ... | 122 | 471 |
| *A. T. Coomber ... ... ... ... | Do. ... ... | 129 | 470 |
| Quinn's Post Poultry Farm ... ... | Do. ... ... | 133 | 470 |
| *A. W. Bailey ... ... ... ... | Do. ... ... | 106 | 465 |
| D. Fulton ... ... ... ... ... | Do. ... ... | 137 | 459 |
| A. Shillig ... ... ... ... ... | Do. ... ... | 140 | 459 |

## EGG-LAYING COMPETITION—*continued.*

| Competitors. | Breed. | August. | Total. |
|---|---|---|---|
| **LIGHT BREEDS—*continued.*** | | | |
| C. Knoblauch | White Leghorns | 126 | 457 |
| A. H. Padman, S.A. | Do. | 111 | 456 |
| *Mrs. Munro | Do. | 128 | 447 |
| R. Holmes | Do. | 110 | 430 |
| *Dixie Egg Plant | Do. | 106 | 414 |
| F. Clayton, N.S.W. | Do. | 124 | 409 |
| J. L. Newton | Do. | 127 | 408 |
| G. Williams | Do. | 122 | 402 |
| Mrs. W. D. Bradburne, N.S.W. | Do. | 138 | 401 |
| Miss M. Hinze | Do. | 101 | 400 |
| *T. Fanning | Do. | 128 | 394 |
| L. G. Innes | Do. | 125 | 391 |
| G. Howard | Do. | 137 | 382 |
| E. Cross | Do. | 134 | 378 |
| *C. C. Dennis | Do. | 103 | 378 |
| J. Holmes | Do. | 125 | 373 |
| *A. E. Walters | Do. | 116 | 372 |
| G. J. White | Do. | 126 | 372 |
| Mrs. J. Carruthers | Do. | 124 | 364 |
| Mrs. S. J. Sear | Do. | 132 | 356 |
| S. C. Chapman | Brown Leghorns | 140 | 346 |
| C. H. Singer | White Leghorns | 121 | 344 |
| E. A. Smith | Do. | 124 | 344 |
| C. P. Buchanan | Do. | 120 | 336 |
| J. Ferguson | Do. | 127 | 335 |
| *Dr. E. C. Jennings | Do. | 99 | 289 |
| **HEAVY BREEDS.** | | | |
| *R. Burns | Black Orpingtons | 151 | 595 |
| A. E. Walters | Do. | 156 | 564 |
| W. Smith | Do. | 142 | 547 |
| *Mars Poultry Farm | Do. | 140 | 526 |
| F. A. Claussen | Rhode Island Reds | 133 | 520 |
| W. S. Hanson, N.S.W. | Black Orpingtons | 128 | 486 |
| *E. F. Dennis | Do. | 144 | 471 |
| Cowan Bros., N.S.W. | Do. | 132 | 455 |
| D. Kenway, N.S.W. | Do. | 128 | 455 |
| P. C. McDonnell, N.S.W. | Do. | 124 | 443 |
| H. Jobling, N.S.W. | Do. | 119 | 422 |
| Mrs. J. H. Jobling, N.S.W. | Do. | 136 | 415 |
| King and Watson, N.S.W. | Do. | 112 | 380 |
| *Oakland Poultry Farm | Do. | 145 | 375 |
| *E. A. Smith | Do. | 156 | 364 |
| R. Burns | S. L. Wyandottes | 134 | 358 |
| F. Clayton, N.S.W. | Rhode Island Reds | 116 | 357 |
| C. B. Bertelsmeier, S.A. | Black Orpingtons | 129 | 357 |
| E. Morris | Do. | 140 | 353 |
| *Kelvin Poultry Farm | Plymouth Rocks | 134 | 324 |
| C. C. Dennis | White Wyandottes | 116 | 323 |
| J. M. Manson | Black Orpingtons | 146 | 320 |
| *Miss M. Hinze | Do. | 141 | 315 |
| *F. W. Leney | Rhode Island Reds | 123 | 281 |
| Totals | | 9,375 | 31,600 |

* Indicates that the pen is entered in the single hen test.

DETAILS OF SINGLE HEN TESTS.

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| G. H. Turner ... ... ... | 76 | 87 | 111 | 101 | 85 | 103 | 563 |
| J. Zahl ... ... ... ... | 98 | 69 | 102 | 36 | 105 | 78 | 488 |
| J. R. Wilson ... ... ... | 90 | 79 | 73 | 87 | 84 | 73 | 486 |
| J. M. Manson ... ... ... | 86 | 77 | 69 | 74 | 81 | 96 | 483 |
| A. T. Coomber ... ... ... | 90 | 30 | 94 | 89 | 75 | 92 | 470 |
| A. W. Bailey ... ... ... | 36 | 68 | 92 | 91 | 89 | 89 | 465 |
| Mrs. J. R. D. Munro ... ... | 110 | 67 | 66 | 65 | 46 | 93 | 447 |
| Dixie Egg Plant ... ... ... | 72 | 83 | 84 | 90 | 85 | 0 | 414 |
| T. Fanning ... ... ... | 38 | 73 | 77 | 71 | 56 | 79 | 394 |
| C. C. Dennis ... ... ... | 72 | 63 | 18 | 72 | 75 | 78 | 378 |
| A. E. Walters ... ... ... | 37 | 57 | 57 | 75 | 83 | 63 | 372 |
| Dr. E. C. Jennings ... ... | 20 | 28 | 54 | 65 | 84 | 38 | 289 |
| R. Burns ... ... ... ... | 73 | 64 | 106 | 86 | 123 | 143 | 595 |
| Mars Poultry Farm ... ... | 80 | 104 | 76 | 99 | 85 | 82 | 526 |
| E. F. Dennis ... ... ... | 81 | 71 | 93 | 96 | 99 | 31 | 471 |
| Oaklands Poultry Farm... ... | 95 | 53 | 52 | 42 | 93 | 40 | 375 |
| E. A. Smith ... ... ... | 56 | 49 | 49 | 93 | 63 | 54 | 364 |
| Kelvin Poultry Farm ... ... | 61 | 45 | 42 | 96 | 31 | 49 | 324 |
| Miss M. Hinze ... ... ... | 57 | 45 | 52 | 58 | 60 | 43 | 315 |
| F. W. Leney ... ... ... | 44 | 46 | 21 | 42 | 89 | 39 | 281 |

## WEIGHTS OF EGGS.

In accordance with the rules of the competition, the eggs of the birds have been weighed. In regard to this, weather conditions were unfavourable when the weighings were taken at the end of July, a high westerly wind blowing continuously for the most of the week. On this account a second weighing was carried out at the end of August for those whose eggs had been under weight in the first instance. In the group pens twelve or more eggs were weighed where possible, and for the single hens the object was to secure at least six eggs before the average was struck. It is very disappointing to find that so many are

below the standard of 24 oz. per dozen. The following table of results show the weight of the eggs to the nearest eighth of an ounce:—

| Pen. | Competitor. | Average Weight per Egg. | Pen. | Competitor. | Average Weight per Egg. |
|---|---|---|---|---|---|
| | | Ozs. | | | Ozs. |
| 1 | Miss Hinze ... ... | 2⅛ | 28 | R. Holmes ... .. | 2¼ |
| 2 | W. Thomas (Quinn's) | 2 | 29 | W. Becker ... ... | 2 |
| 3 | F. W. Leney ... | 1¾ | 30 | C. P. Buchanan ... | 2 |
| 4 | Moritaz Bros. ... | 2 | 31 | Mrs. Carruthers ... | 2⅛ |
| 5 | T. B. Hawkins ... | 2 | 32 | G. Williams ... ... | 2 |
| 6 | G. W. Holland ... | 2¼ | 33 | Mars Poultry Farm | 2⅛ |
| 7 | C. Porter ... ... | 2 | 34 | A. Shillig ... ... | 2 |
| 8 | T. A. Pettigrove ... | 2 | 35 | G. Howard ... ... | 1¾ |
| 9 | E. A. Smith ... ... | 2 | 36 | G. J. White ... .. | 2⅛ |
| 10 | C. Knoblauch ... | 1⅞ | 37 | J. H. Newton ... | 1⅞ |
| 11 | J. Ferguson ... ... | 2⅛ | 38 | H. Jobling ... ... | 2⅛ |
| 12 | E. Chester ... ... | 1⅞ | 39 | D. Kenway ... ... | 2 |
| 13 | D. Fulton ... ... | 2 | 40 | R. Burns ... ... | 1⅞ |
| 14 | C. Chester ... ... | 1⅞ | 41 | King and Watson ... | 1⅞ |
| 15 | Mrs. S. J. Sear ... | 2 | 42 | Mrs. J. H. Jobling ... | 2⅛ |
| 16 | L. G. Innes ... ... | 2 | 43 | P. C. McDonnell ... | 1⅞ |
| 17 | C. H. Singer... ... | 1⅞ | 44 | Cowan Bros. ... ... | 2 |
| 18 | E. Cross ... ... | 2 | 45 | F. Clayton ... ... | 2⅛ |
| 19 | J. Holmes ... ... | 2⅛ | 46 | C. B. Bertelsmeier ... | 1⅞ |
| 20 | T. Taylor ... ... | 1⅞ | 47 | A. E. Walters ... | 2 |
| 21 | Kelvin Poultry Farm | 1⅞ | 48 | W. Smith ... ... | 1⅞ |
| 22 | W. R. Crust ... ... | 2 | 49 | E. Morris ... ... | 1¾ |
| 23 | J. G. Richter ... | 1⅞ | 50 | J. M. Manson ... | 2 |
| 24 | S. C. Chapman ... | 1⅞ | 51 | C. C. Dennis ... ... | 2 |
| 25 | Mrs. W. D. Bradburne | 2⅛ | 52 | W. G. Hansen ... | 2 |
| 26 | A. H. Padman ... | 2 | 53 | F. A. Claussen ... | 2⅛ |
| 27 | F. Clayton ... ... | 2 | | | |

## SINGLE HEN PENS.

| No. | Competitor. | A. | B. | C. | D. | E. | F. | Group. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Oz. |
| 1 | C. C. Dennis ... ... | 2⅛ | 2 | 2 | 2⅛ | 2⅛ | 1⅞ | 2 |
| 2 | J. M. Manson ... .. | 2 | 1⅞ | 2⅛ | 2 | 2⅛ | 2 | 2 |
| 3 | Mrs. J. R. Munro ... | 2 | 2 | 2 | 2 | 2⅛ | 2 | 2 |
| 4 | A. E. Walters ... ... | 2 | 2 | 2⅛ | 2 | 1⅞ | 1⅞ | 2 |
| 5 | G. H. Turner ... .. | 2¼ | 1⅞ | 2 | 1⅞ | 2⅛ | 2 | 2 |
| 6 | J. Zahl ... ... ... | 2 | 2¼ | 1⅞ | 2⅛ | 2 | 2 | 2 |
| 7 | J. R. Wilson ... ... | 2 | 2 | 2¼ | 2⅛ | 1⅞ | 2 | 2 |
| 8 | T. Fanning ... ... | 2 | 2 | 1⅞ | 2 | 2⅛ | 2 | 2 |
| 9 | Dixie Egg Plant ... ... | 2 | 2 | 2⅛ | 2⅛ | 2 | ... | 2 |
| 10 | Dr. Jennings ... ... | 1⅝ | 2 | 1¾ | 2 | 2 | 2 | 1⅞ |
| 11 | A. W. Bailey ... .. | ... | 2⅛ | 2¼ | 2¼ | 2¼ | 2⅛ | 2¼ |
| 12 | A. T. Coomber ... ... | 2⅛ | 2⅛ | 1⅞ | 2 | 2⅛ | 2 | 2 |
| 13 | Mars Poultry Farm ... | 2 | 1⅛ | 2 | 2 | 1¾ | 1⅞ | 1⅞ |
| 14 | E. A. Smith ... ... | 1⅛ | 2⅛ | 1⅞ | 1⅞ | 2¼ | 2 | 2 |
| 15 | R. Burns ... ... ... | 2¼ | 2 | 2¼ | 2 | 2⅛ | 1¾ | 2⅜ |
| 16 | Kelvin Poultry Farm ... | 1¾ | 2 | 1⅞ | 1⅞ | 1¾ | 1¾ | 1⅞ |
| 17 | Miss Hinze ... ... | 2⅛ | 2 | 1⅞ | 2 | 1⅞ | 2⅛ | 2 |
| 18 | E. F Dennis ... ... | 1⅛ | 1¾ | 1⅞ | 1¾ | 1¾ | 2 | 1⅞ |
| 19 | Oakland Poultry Farm .. | 1¾ | 1¾ | 2 | ... | 1⅞ | 2 | 1⅞ |
| 20 | F. W. Leney ... ... | 1⅞ | 2⅛ | 1⅞ | 1⅞ | 2 | 2⅛ | 2 |

# POULTRY BUILDING AND APPLIANCES DESIGNED AT THE QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

At the National Association's Exhibition, Brisbane, held in August, 1917, the College erected several full-size model poultry pens and had on view several useful poultry appliances. A number of novel features were embodied, and in the design the objects held in view were economy in construction, economy of labour in working, sanitation, and ventilation—all these points being considered in regard to the Queensland climate. In presenting the following plans and specifications, we quite recognise that the various designs are not perfection. Still, they are worthy of notice, and if they stimulate an interest in poultry building construction generally, they will largely have served their purpose, for we feel that it is a matter of importance for Queensland to evolve its own type of farm building, a type which must conform with our climatic conditions.

## Poultry Pens.

The houses are constructed on the continuous system, the continuous back facing the weather, probably west or south-west; thus the fronts, which are only partially walled, face east or north-east. To each pen there is a small run, and the whole of the floor of each house is used as a scratching pen. All fittings, such as nest-box, dropping board, and perches, are detachable, and when removed, leave the inner walls of the house readily accessible for disinfecting. As far as possible, the houses and runs are worked from the back, and successive rows of houses are separated by lanes. (*See* Sketch No. 1.)

## Construction of the Houses.

The houses shown are 11 feet by 5 feet, and are 6 feet high at the back, and 5 feet 6 inches high in front. The uprights are 3-inch by 2-inch hardwood, but may be of bush saplings. Around the bottom and on the inside of the sheds 3-inch by 1-inch hardwood battens are fixed to a distance of 2 inches or more above the ground level, so as to allow of the floor of the house being filled with good subsoil which can be wet and tamped down to a solid floor. Above the hardwood battens 8-inch by 1-inch pine boarding is fixed to retain the scratching litter. This boarding is also placed inside the studs. At the door the 8-inch board fits between fillets, and can be removed when cleaning out the litter. Above the pine boarding, 3-inch by 1-inch pine battens are fixed as follows:—At the back, extending from the door-jamb to the end of the building, the first batten is set 1 foot up, measuring to its upper edge. The second batten is 3 feet above this, both inside the studs. Half the foot interval is filled in with a foot wide strip of roofing felt, leaving the other half as an opening for attaching the external nest-box (*see* Plate). The whole of the 3-feet interval is similarly filled. The remainder is covered with a 9-inch strip of roofing felt, placed outside the studs, and attached at its upper edge to the roof plate and at its lower to a 3-inch batten fixed outside. By this means a weatherproof opening is created for ventilation. (See plan.)

This ventilation system is specially to be recommended, as the vertical opening creates a draught even on still days. With a wind

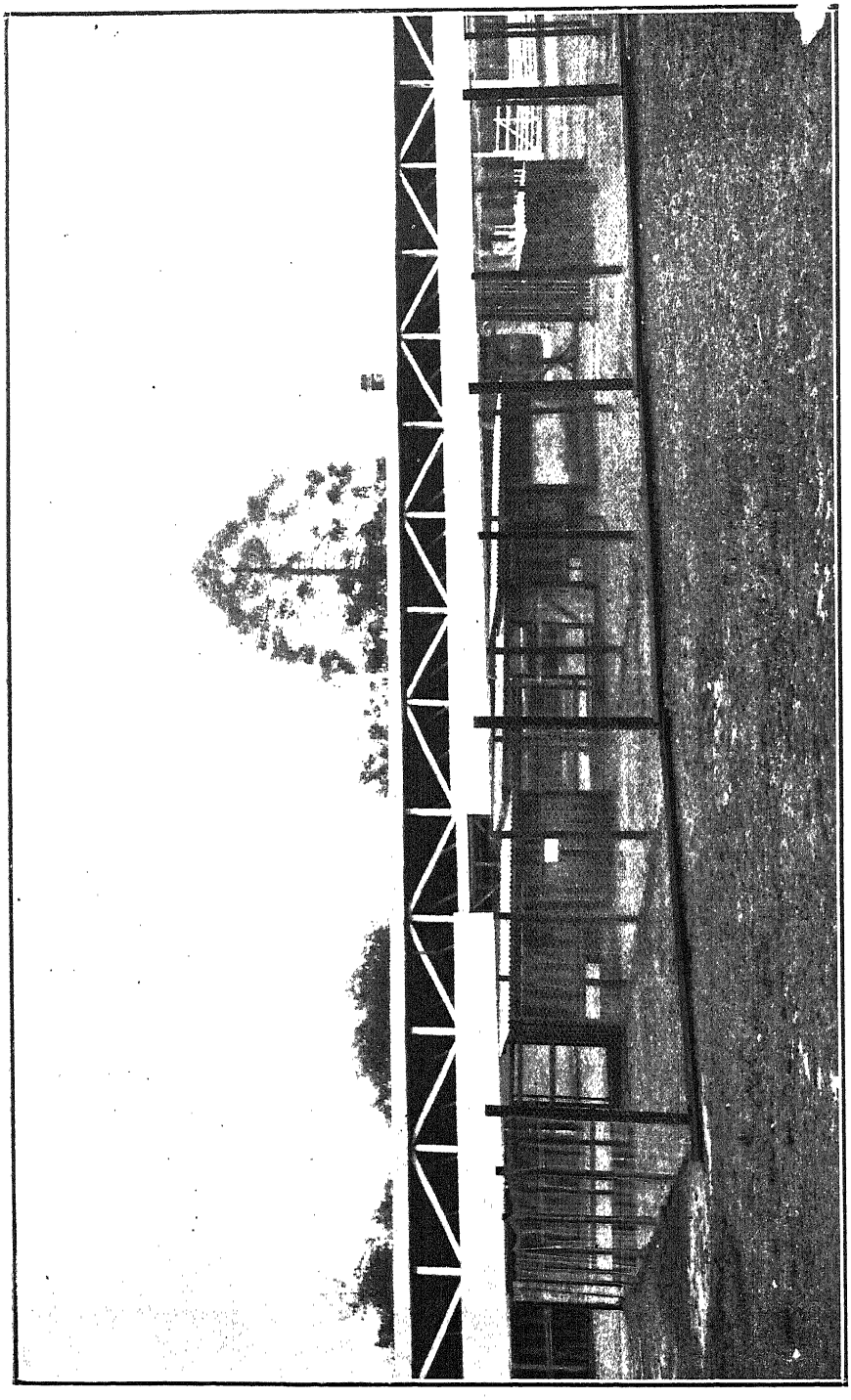


PLATE 24.—GENERAL VIEW OF EXHIBITION POULTRY PENS.

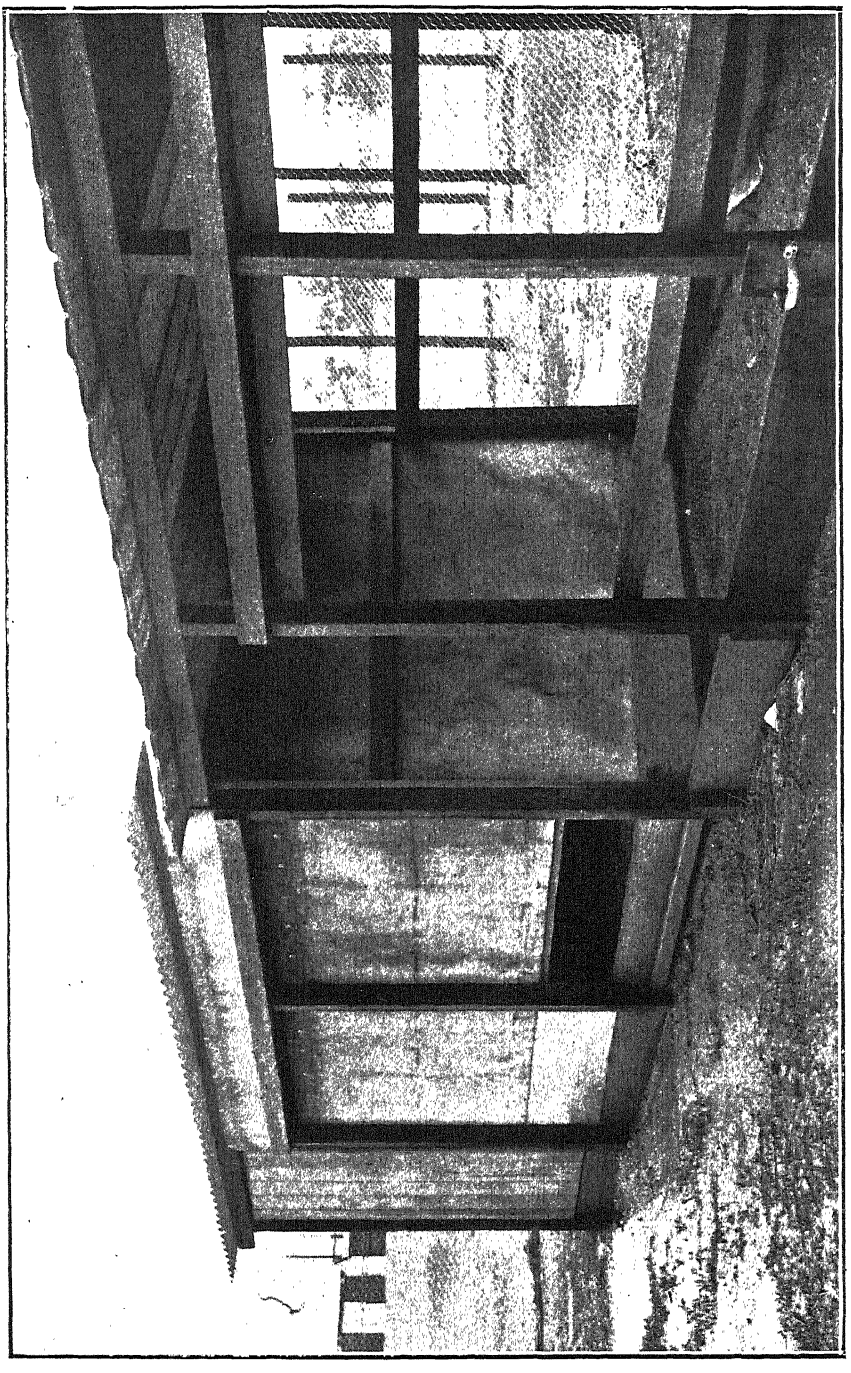


Plate 25.—Back View, showing a Completed House and Framing Walled with Roofing Felt.

blowing at the back of the buildings, the air is given an upward tendency, and as it passes from a comparatively narrow opening into the wider space of the building its rate of motion is slowed off and there is no down draught thrown on to the birds. On the other hand, if the wind comes from the front, it is blocked by the back in the lower part of the house, while the upper air is forced to curl downwards to escape through the vent. This downward curl prevents the lower air from moving upwards and tail-draughting the birds. (*See* Plate.)

One-half of the front is walled up with a 3-feet width of felt, and above this wire netting is used. The ends are closed in a manner similar to the back, except that the first batten is placed up 15 inches and the next 3 feet above this. By this means these end battens can be extended over the back and front battens, and are nailed on to the studs.

Having fixed the back and front walling, 2-inch and 1-inch fillets are nailed on the inside of each corner post to carry the end walling. It will be noted that the ends are not completely filled right up to the roof, nor is such filling necessary, except on the outer ends of the continuous building.

The roof plates are 3-inch by 1½-inch pine, halved into the studs. No rafters are used. If covered with corrugated iron the sheets are nailed directly on to the roof plates. If covered with roofing felt, board across from roof plate to roof plate and then lay the felt longitudinally with an overlap of 2 inches at the joint.

If any other flexible material, such as tarred or oiled hessian, is used for walling, a similar framework should be used, as later the more permanent roofing felt can be easily attached.

Where sawn palings can be secured at a reasonable cost, a good walling can be made of them, and their use will dispense with the 8-inch by 1-inch pine boarding, except at the doorway, the opening in front, and at the nest-box opening. When using the palings, set the first layer with spaces between them of 2 inches or more, depending on the width of the palings. Set the second layer so as to cover the gaps, allowing an inch overlap on each side. (*See* Plate.)

The dropping board is 8 feet by 2 feet, and rests on the lower batten at the back, and is supported at the end wall by a vertical batten (*see* fig. 4), while the outer end rests on an angle bracket, thus leaving the floor quite free for cleaning.

The door is made of T. and G. pine, and opens inwards. The roosts are made of 3-inch by 1-inch hardwood, attached to hardwood blocks at each end. These blocks should be small enough to allow the end of the perch, block and all, to be inserted into a kerosene tin for disinfecting purposes. The roost merely rests on the dropping board; it is not attached.

The nest-box is external, and consists of a long box 14 inches wide at bottom, 14 inches deep at back, and 16 inches deep at front. The ends of 1-inch pine, the top, back, and bottom of ½-inch timber. The ends are cut so as to allow the top to extend inside the building while the bottom rests against the pine boarding. The arrangement for the covering is shown in fig. 6, the hinged part having an

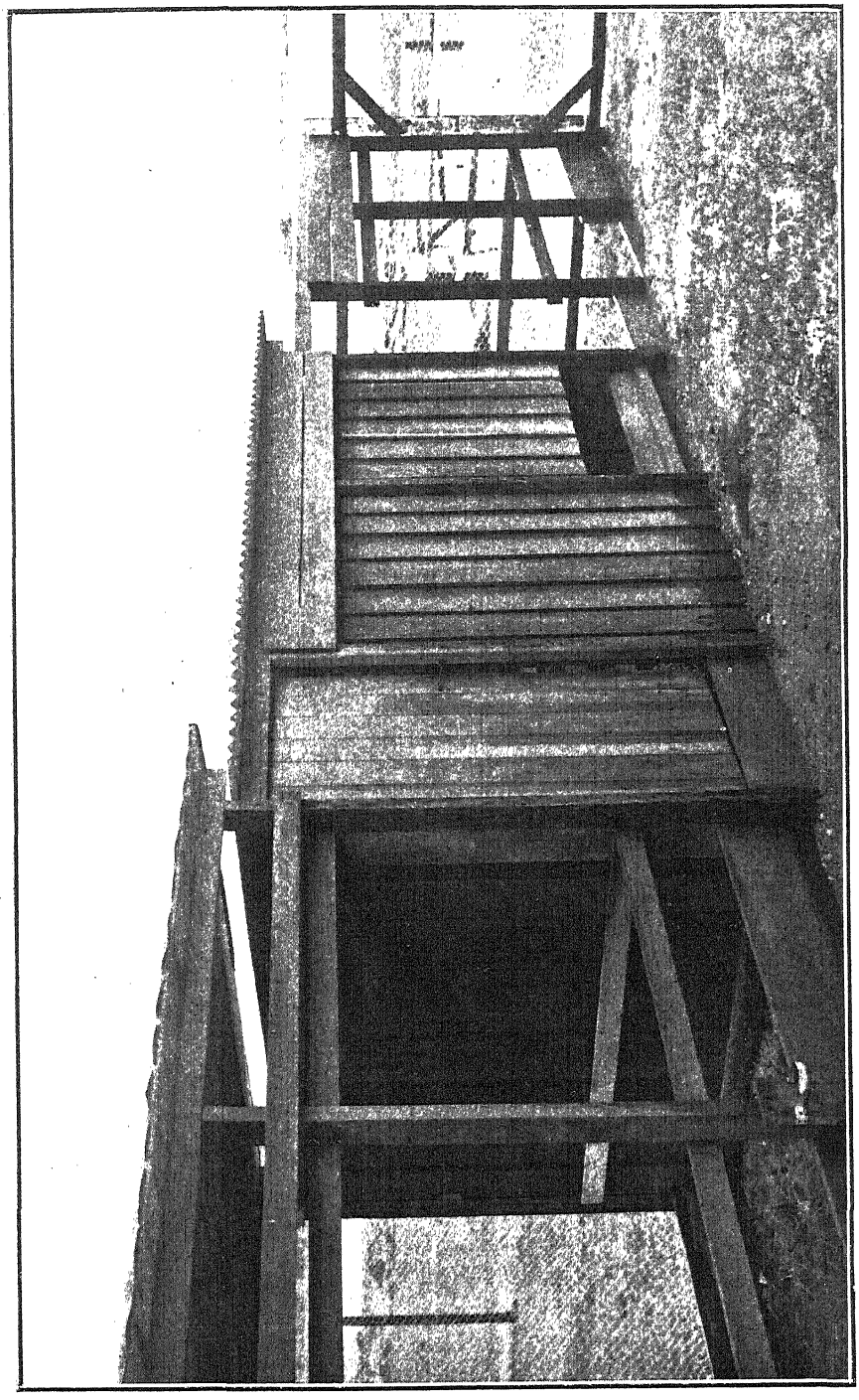


Plate 26.—Back View, showing Completed House and Framing Walled with Sawn Palings.

underlay of 1½ inches, so that, when closed, it forms a waterproof lid. Along the inner edge of the fixed part of the top is a 2-inch by 1-inch fillet which hooks under the pine batten when the nest-box is in position.

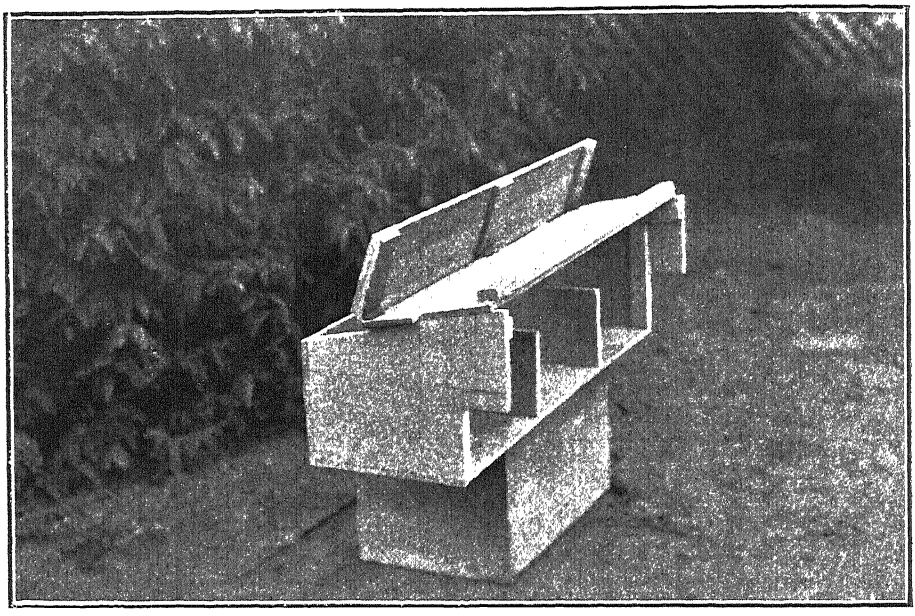


PLATE 27.—DETACHABLE EXTERNAL NEST BOX.

On the pine boarding, and so as to allow the nest-box to rest on it, there is another 2-inch by 1-inch fillet. To remove the nest-box, lift the outer edge and the box will drop out.

## FENCES.

For the fencing of the yards, corner posts of 3-inch by 3-inch hardwood are used. For intermediate posts 3-inch by 1-inch hardwood set on edge to the wire are used. They are sunk 18 inches in the ground and have nailed on to the bottom portion a short length of 3-inch by 1-inch hardwood about 2 feet long, so as to make that portion in the ground 3 inches by 2 inches. The posts are set about 12 feet apart. All along the bottom, and half sunk into the ground, is nailed a 3-inch by 1-inch batten. Where joins have to be made, drive in a 3-inch by 1-inch stake to nail on to. Note, there are no struts used for the corner posts, nor any top straining wire. To attach the wire-netting, roll out the length, attach the shorter edge (one edge is always shorter than the other) to the tops of the posts, pulling as tight as you can by hand. Next, starting from the centre post of the fence, stretch the wire down well and nail to the batten at the bottom of the post. Treat each post similarly, working out towards the ends. Next pull the wire down fairly firmly in the centre of each panel, and nail to the bottom batten, then half-way between centre and each post, and again in half intervals. When the bottom is completed nail down each corner post; then, with a

piece of 3-inch by 1-inch catch each successive mesh along the top, and push upwards so as to straighten the top line. If too much strain has been exerted in pulling down on to the batten in the centre of the panels, this may be somewhat difficult. After the above has been completed the wire should lie fairly evenly, but if there are bulges, even big bulges, they can be removed as follows:—Take a piece of hardwood about 6 inches long and 1 inch square. Cut across one end a coarse sawcut about ½-inch deep. Use this as follows:—Slip the sawcut over the double wire between meshes, and then turn smartly. This makes a kink which will take up the slack. Where a bulge occurs, start somewhat above it working vertically down through its centre to some little distance below the bulge. Start with a light twist, increasing as you come into the bulge itself, and get gradually lighter as you finish. If properly carried out, the above gives a well-laid netting fence which, because of even tension, supports itself. There are no struts to assist birds in climbing over, while the absence of a visible top wire prevents a bird from attempting to fly. The yards are shown as 37 feet long, allowing four dividing fences to be cut from a 50-yards roll of wire netting. (*See* Plate.)

### Combined Broody and Cockerel Coop.

Plate 28 shows a combined broody and cockerel coop. The uprights are 2 inches by 2 inches, and the general framework consists of 2-inch by 1-inch timber, the sides, back, and roof being made of ½-inch pine. The floor is about 2 feet off the ground, and the coop is 2 feet deep, 2 feet 6 inches high in front, and 4 feet wide. The picture shows the construction of the doors, the lower parts of which are slotted so as to allow of

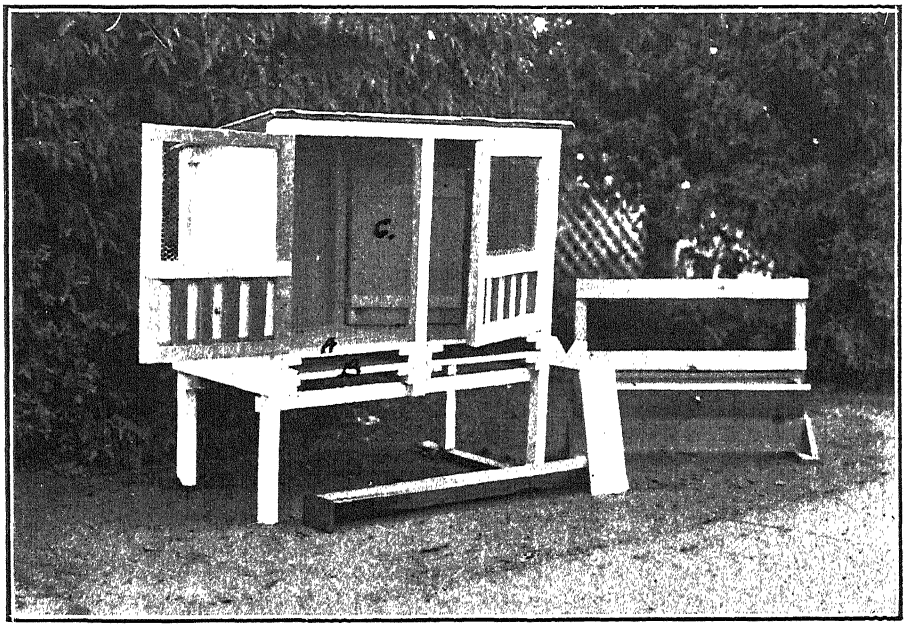


Plate 28.—Combined Broody and Cockerel Coop.

feeding from the trough (shown on the ground), which fits into the V-shaped bearers at the ends. The slotted portion can, however, be closed by means of a board held in position by battens. The floor can be made either slatted or solid by altering the position of the false bottoms A and B which slide into position. A dividing door (C) is shown, which allows a cockerel to be kept in one half with solid floor and door slats covered and a broody hen in the other half, with slatted floor and uncovered slats in the door to enable her to feed from the outside trough. Note, the trough is so placed that it does not interfere with the swing of the doors.

To the right of the broody coop is shown a *swinging wet mash hopper* which could readily be placed in the back wall of a poultry-house. It consists of a V-shaped trough hinged on to the building along its bottom line. The picture shows the trough swung out ready for filling or cleaning as the case may be.

Plate 29 shows a safety hen and chicken coop. It consists of a box 2 feet by 2 feet square, 2 feet high in front, and somewhat less behind. Near the top of both back and front there is an opening covered with wire gauze. The top is loose and is shown leaning against the side. The box is loose on the bottom flooring. The door in front is double, the inner portion is framed round with 2-inch by 1-inch, and covered

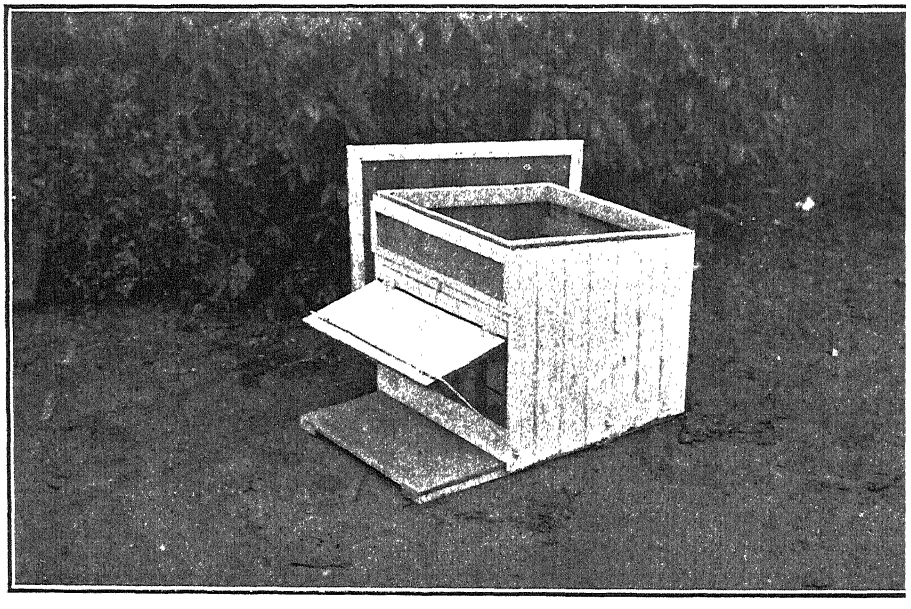


Plate 29.—Safety Hen and Chicken Coop.

with slats, hinged from the bottom and kept in position by a button at the top. The outer portion consists of a board to cover the slats. This is hinged to the upper framing of the inner door. An iron rod, bent as shown in the picture, passes through eyelets on the face of this board

and ends in hooks which fit into eyelets screwed into the side of the box. A second eyelet is shown further back, to hook into when the door is closed.

By this arrangement the hen can be kept in the coop, the chickens running free. The raised door acts as shade for the food. At night all can be closed up, and by lifting the lid and brushing out mosquitoes the coop becomes practically pest proof. As the coop is loose from the bottom, it can be raised slightly and the hen walked along till the floor is uncovered, when it can be readily cleaned, placed on fresh soil, and the coop and hen replaced on it.

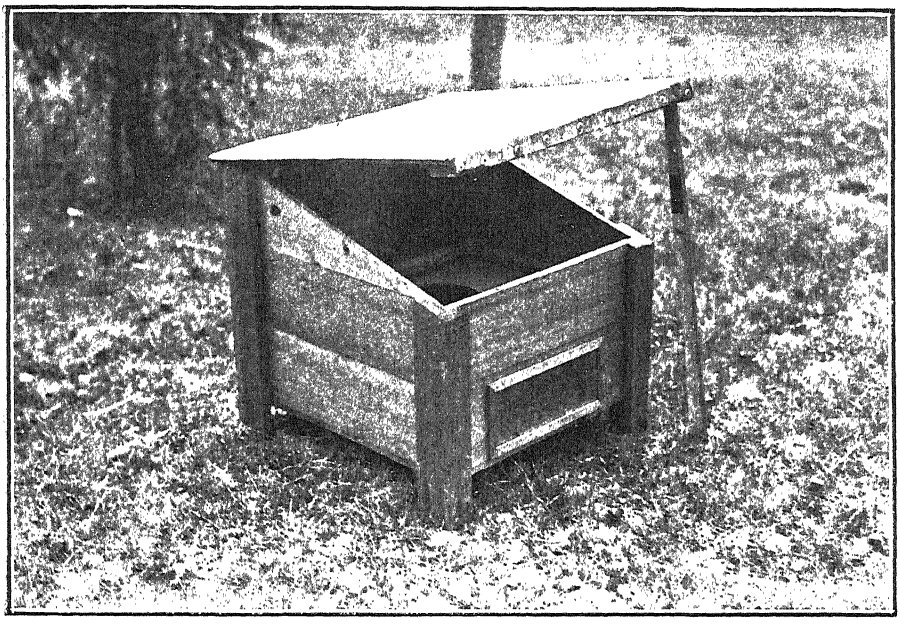


Plate 30.—A Simple Heated Brooder.

Plate 30 shows a simple brooder using an ordinary hurricane lantern as a source of heat. It consists of a box 3 feet to 3 feet 6 inches square on the base, 2 feet high in front, and 18 inches high at the back, the whole standing on legs about 6 inches long. In the front there is an opening to lead out into a wire-covered run. The top is hinged on the front. Inside there is a cylinder of wirenetting surrounded by felt sheeting. This is large enough in the circle to hold a hurricane lamp, allowing about 2 inches to spare all round. The cylinder is about 8 inches high. Resting on fillets on the sides is a false top with a hole cut in its centre of somewhat less diameter than the circle of the cylinder described above, but large enough to allow the hurricane lamp to pass through.

This false top should lie about 1 inch above the wire cylinder and below the top of the lamp glass, thus letting the lamp fumes deliver above the boarding. Three-quarter-inch auger holes are bored through the sides and front to carry off the burnt air.

# Viticulture.

## REPATRIATION AND THE WEST.

By C. A. GATTINO.

In my notes on "Viticulture and Wine Industry after the War," which appeared in the May issue of the "Queensland Agricultural Journal," I stated that, with the protection of the Government, the returned soldiers would find greater attraction and more glorious promise in the future of a vineyard than in anything else.

In the West, especially where immense areas of dry calcareous loam soil are not utilised and are uncultivated, and where the irregular and unreliable rainfall prevents the progress of intense culture of other crops, the grape culture is the most adapted for such districts.

The men who are willing to settle on the land when they return home are generally looking for land in the neighbourhood of the locality in which their relatives and friends reside. Many thousands of our best lads, who have so willingly gone abroad to defend this fair land, belong to these Western districts, and it is only fair that the requirements of those brave returned soldiers should be satisfied by providing the best possible conditions and attractions for adequately settling them upon the nearest land from where they originally came.

I can firmly state that in these Western districts grape culture is the most appropriate, the most advantageous and attractive cultivation for small holdings, and for our returned soldiers; but what should we provide to assure the success and prosperity of such a great agricultural pursuit?

Above all, the help of the Government, by establishing a Western soldiers' group settlement formed for that culture, is essential.

By doing this, the Government would be able to offer returned soldiers the most reliable inducements, with the cheapest and most efficient organisation and instruction.

The settlers also will be benefited, because, having small pieces of suitable land in the same group, they can easily assist each other in ploughing, subsoiling, combating diseases, pruning, harvesting, &c.; they can also join together and build a large cellar in common, form an association, co-operative stores, &c.

The Government, however, will have to assure:—

1. That an expert Government viticulturist will give practical and active assistance so as to make grapegrowing as easy and profitable as possible, and teach them how to make good, natural, hygienic wine.
2. That grafted phylloxera resistant vines be supplied to them at special rates and conditions.

3. That the formation of a co-operative winery (as per my articles which appeared in the September, October, and November, 1916, issues of the "Queensland Agricultural Journal") will be subsidised, or a State winery established.

4. That the wine industry will be protected by adequate laws, facilitating the development of the local production and the consumption of wine.

These few inducements will assure the formation of such soldiers' group settlements, and the vine culture, which is a neglected agricultural pursuit in this State, will flourish and bring new wealth to the country.

As I said before, there is no other culture better suited for closer settlement.

Vine culture gives more freedom than any other in the light work that it involves, and it is unequalled for its constant and remunerative returns in comparison with the small capital that it requires.

Winegrowing employs more labour per acre than any other form of agriculture, and is a primary industry which should be of national importance in a country like this, so eminently suited for the industry.

Besides the labour involved in grapegrowing, other forms of labour and wealth are attached to every consequent branch of the wine industry.

Therefore, the industry is of economic and national importance, and must be well considered by our politicians in the framing of their post-war policies for employing the hundreds of thousands of men who will be returning home without affecting or endangering the labour market of Australia.

The fact, also, that our Australian troops now in Europe are daily enjoying their glass of light wine; recognising it as the most wholesome and purest of all stimulating drinks; observing the sobriety of the countries so eminently wine producers and drinkers; admiring how arid rocks and plains were converted into such beautiful smiling vineyards, with up-to-date cellars and distilleries, through which industry millions of people find peaceful and light work, will necessarily create in those brave soldiers the ambition to follow their mates of the allied countries in their wholesome and sober drinking habits, and induce them to make every effort to bring the viticultural industry of Australia to a prominent rank in similar industries of the world.

Certainly we must not mix up this agricultural pursuit with the liquor question. They are two different things altogether; I contend, rather, that the progress of the viticultural industry would lead to the automatic solution of the liquor problem—"The wine chases out the alcohol," and once the winegrowers become the proprietors of one of

the prominent cultures of the country and be well organised, with power to consolidate their political privileges, they would necessarily force the introduction of adequate laws for controlling and moderating the alcohol traffic.

By encouraging the proper handling and the progress of the wine industry, the consumption of wine must increase, drunkenness caused by alcohol be minimised, and temperance promoted.

The Wine Growers' Association are practically the real temperance societies, the actual temperance party of this country having fanatically jumped into the prohibitionist stage.

Pure light wine I consider the best temperance agent: but as long as the production of wine, for lack of Government encouragement, remains a neglected industry, so long will alcohol continue to be the triumphant beverage. There is no hope of accomplishing a thorough reform, for human nature has proved that it needs a stimulant.

By a practical scheme, which can be easily elaborated on the principles abovementioned, the Government could already make a start by establishing one of these grape group settlements in the Maranoa District, where millions of acres, near railway lines, are well adapted for settlement of that kind.

I conclude with the hope that our brave soldiers, when they return home, will be the triumphant saviours of this rich but throttled agricultural industry, as they were triumphant in the powerfully obstructed landing at Gallipoli.

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## HINTS TO GRAPEGROWERS.

*Location.*—The location of a vineyard, the choice of soil and the variety of grapes to be grown on it, have great influence on the productivity of the vines.

The vine grows best on hillsides, or possibly self-draining grounds, in localities sheltered from cold winds, not subject to late frosts or to heavy rainfalls during the gathering of grapes.

*Soil.*—A dry, calcareous loam soil is the most suitable for vines. Soils without any lime are not adapted to this cultivation unless you fertilise them with agricultural lime. Potash and iron are also very good soil qualities. The soil destined to this culture must not hold the moisture and should be at least 3 feet deep.

*Planting.*—Having chosen an appropriate location for the vineyard, and the variety of vines to plant, shall we choose cuttings or rooted plants?

Opinions on this subject are varied. There are those who prefer the rooted plants, because they are already provided with roots and are able in the first year to develop quicker and have the advantage of gaining one year's vegetation during the period of the first three years. Others, on the other hand, condemn the rooted plants, saying that being used to a certain soil they will suffer by replanting and bringing them into another soil, and never become strong, healthy plants; the cuttings instead, on the contrary, forming roots in the same soil where they grow, will get used from the beginning to the conditions of the same soil and climate.

For myself, I prefer the rooted plants, provided, however, that you can get them one year old and possibly grown in a similar soil to that of your vineyard. In case you should be compelled to use cuttings, get only strong, sound, and uniform ones; of short jointed wood, with well fed eyes, and with the stem smooth and firm without any spot produced by disease.

The method of planting grapes varies according to the soil, and the distance between the plants also varies according to the cultivation and training methods to follow.

If the vines are trained so as to form the head about a foot above the ground, situated in arid dry soil, and are to be cultivated with the hoe only, you can plant them from 3 to 4 feet apart each way. In training them for high cultivation, the distance between each plant should be greater. There is no plant like the grape which in variety or form of training and cultivation is so dependent upon climate, soil, and location; therefore the width of the rows would vary according to the aforesaid circumstances. The ground will have to be kept free of weeds, and it is left to the grower to do this work in the most economical and appropriate way. If the location of the ground allows of it, and you want to cultivate the vineyard by ploughing between the rows and hoeing around the vines, then the width of the rows should not be less than 7 feet, and in this case, you can plant the vines in the rows less than 3 feet apart. For planting rooted plants, dig holes of about 18 inches in depth, at the bottom of w hich place a very fine mixture of earth and manure. After having shortened the roots and tops of the plant, lay it in the hole above the aforesaid manure mellowed earth, spread out its roots evenly and vertically, then fill in the hole with earth, taking care that the soil immediately above the roots be well pulverised. The upper bud is, of course, left above the ground. In planting cuttings you can practice the same system as for rooted plants, or plant them by making a hole in the cultivated ground with a crowbar, and putting the cutting in, making the earth well adherent to it. If while planting you fear a drought, it is advisable to water the hole and the cutting. It is also a good practice for very compact soils to put sand or sawdust in the holes where you have to plant the cuttings. The rooted plants or the cuttings must not be planted too deep—18 inches is deep enough. In laying the cuttings too deep you would prevent the formation of an ample roots system.

(*To be continued.*)

# Botany.

## PLANTS POISONOUS TO STOCK.

By C. T. WHITE, Acting Government Botanist.

### TAPE VINE (STEPHANIA HERNANDIAEFOLIA, *WALP.*).

The list of plants in Australia reputed poisonous or harmful to stock is a fairly lengthy one. In very few cases, however, have we any definite information about the particular plants (suspected), there being a great lack of knowledge on this most important matter. There are two methods of gaining more accurate information on the subject: the one by the experimental feeding of animals upon the suspected plant and the other by the establishment by chemical analysis of the presence therein of definite poisonous principles.

At various times specimens of the vine *Stephania hernandiæfolia* (Tape Vine) have been sent in for identification as being suspected of causing losses amongst stock.

In December, 1912, Mr. J. L. Bowman, Stock Inspector, Booningba, wrote to the Department "I am forwarding a small parcel of vines gathered on Tallebudgera Creek about the scene of the deaths of cattle which have taken place during November and December for several years past; several local residents believe this vine to be poisonous, and say that cattle eat it freely at times."

In February, 1916, Mr. D. McKenzie, Beechmont, sent specimens with the remark "We had four goats and four young poddies that died apparently from poison; they were feeding in the paddock in which these plants grow."

#### POISONOUS PROPERTIES.

Dr. T. L. Bancroft (Proc. Linn. Soc. N.S.W., vol. IV., n.s. p. 1063, 1889) found the roots to contain an exceedingly poisonous alkaloid. Rennie and Turner (Trans. Roy. Soc., Sth. Aus., vol. 17, p. 186, 1893, and Report A.A.A.S., 1895, p. 277) separated and identified *picrotoxin* as one of the constituents of the plant, and stated that there was at least one alkaloid in addition, as reported by Dr. Bancroft. Dr. J. Shirley (Proc. Roy. Soc. Q., vol. XI., p. 88, 1896) records the use of *Stephania hernandiæfolia* as a fish poison among the aborigines of the Nerang and Mudgeraba districts; he states "A well-known waterhole or rockpool, noted as a good haunt for fish, is selected and the bruised stem (cut up into about 2 ft. lengths) is scattered about in the water of the pool, the fish float on the surface of the water and soon find their way into the dilly-bags of the operators." Harris and Smith, in their paper "Fish Poisons of the Queensland Aborigines" (Mem. Queens. Mus., vol. V., p. 8, 1916), working on the whole plant state: "Separation of the alkaloid and of a supposed picrotoxin fraction showed the former to be rather slowly toxic at a concentration of 1:50,000; with the latter no physiological effect was observed. The alkaloid is probably the chief active constituent of the poison."

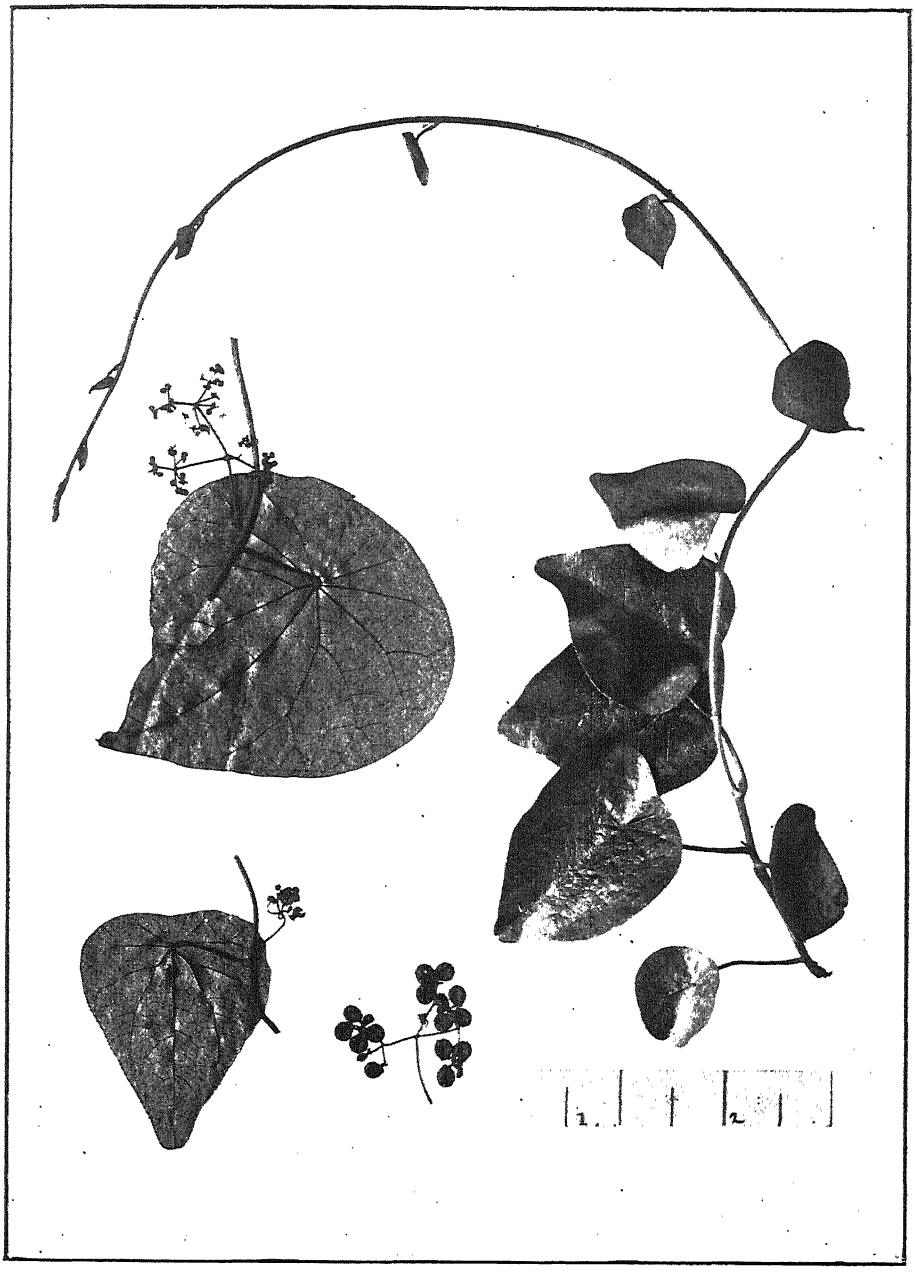


Plate 31.—Tape Vine (Stephania Hernandiaefolia).

BRIEF DESCRIPTION.

A climber. Leaves broadly ovate, orbicular or nearly triangular, usually more or less peltate. Flowers in umbels in the axils of the leaves, the common peduncle bearing about five rays, each ray terminated by a head of 8-12 minute flowers. Drupe compressed, orange-red, epicarp succulent, endocarp bony and transversely tuberculate.

DISTRIBUTION.

Common in the coastal country throughout Queensland; also found in New South Wales and Victoria: it extends beyond Australia, being found in tropical Asia and tropical Africa.

## MAPLETON STATE SCHOOL.

By the courtesy of the Under Secretary for Education we have received the following letter addressed to him by Mr. F. E. Watt, head teacher of the Mapleton State School, giving an account of an educational visit to the school by the pupils of the Nambour Rural and Yandina Schools on the 10th August last:—

"On Friday, 10th August, a party of eighty pupils from the Nambour Rural School and Yandina School visited this school for the purpose of observing the agricultural work of the school plot, and taking part in the planting of a number of citrus trees in the new portion of the plot.

Mr. T. G. Fisher was in charge, and other teachers present were Messrs. J. Lane, J. T. Wilson, T. E. Martin, and F. M. Barton.

On arrival at Mapleton, about 11.45, the pupils marched to the school. Here I gave them a brief outline of the work to be undertaken, explaining the methods to be adopted and objects aimed at. I showed them scale pests at various stages and drew their attention to several interesting features of the school plot. After lunch the children were divided into groups, which were taken charge of by members of the school committee, Messrs. W. J. Smith, J. R. Morris, and W. Collins, experienced and successful fruitgrowers, who had kindly attended to assist in planting operations. After a demonstration of deep-planting by Mr. Smith, the squads set to work and in a little more than an hour, under the careful supervision of the abovenamed gentlemen, the children had planted a small orchard of twenty-four trees. The majority of them took a keen interest in the work and seemed quite delighted to be allowed to carry out the practical part of the work.

On completion of planting, the pupils marched to the orchard of Mr. W. J. Smith to witness pruning operations on the Maltese system. An expert pruner was at work, and he gave an exhibition of pruning for the benefit of the children. The party left Mapleton at 3.30 and arrived at Nambour about 4.45.

The trees were donated to the school by Messrs. Ferguson and Son, through their agent, Mr. Droney, of Woombye, and appear to be a healthy, vigorous lot. Of the total number, twelve are Washington Navels, on which variety it is proposed to try methods of (1) deep cultivation, (2) cincturing, (3) irrigation, in an attempt to solve the problem of the irregular cropping of this variety.

# General Notes.

## REGISTRATION BY THE POSTMASTER-GENERAL OF LABORATORIES.

The Department of Agriculture and Stock has received from the Deputy Postmaster-General of the Commonwealth of Australia, notice to the effect that, as it is understood that the Department's Stock Experimental Station at Yeerongpilly may be sending or receiving pathological or bacteriological specimens by post for laboratory diagnosis, a form for completion with the view of the laboratory in question being registered in pursuance of the Postal Regulations has been supplied to the department:—

(2) Regulations 46 and 76.

46 (*a*) Pathological specimens addressed to laboratories registered by the Postmaster-General may be accepted for transmission by registered package post under the following conditions, viz.:—

(*b*) The liquid or substance forwarded for examination must be enclosed in a receptacle hermetically sealed, which receptacle must itself be placed in a strong wooden or metal case in such a way that it cannot shift about, and with a sufficient quantity of some absorbent material (such as sawdust or cotton wool) so packed about the receptacle as absolutely to prevent any possible leakage from the packet in the event of damage to the receptacle.

(*c*) The packet must on no account be dropped into a letter box or be sent by parcel post. Any packet of the kind, whether registered or not, found in the post, not packed as directed, shall be deemed to be posted in contravention of the "Post and Telegraph Act, 1901-1913," and dealt with accordingly.

(3) Any person who sends by post pathological specimens, otherwise than as provided by these Regulations, shall be liable to a penalty not exceeding £50.

(4) A packet containing any pathological specimens shall not be accepted for transmission, or, if found in the post, shall not be delivered unless addressed to a laboratory which has been registered by the Postmaster-General in accordance with these Regulations.

76. Pathological specimens addressed to the General Superintendent, Imperial Cancer Research Fund, London, and sent by registered medical or veterinary practitioners, or by recognised pathological or related scientific laboratories, may, if securely packed in tubes enclosed in wooden cases, be forwarded by sample post.

## UTILISING COTTON IN THE HOME.

We have received from Mrs. H. C. P. Crees, of Ayr, two pretty samples of crochet work with Queensland cotton, grown, spun, and worked up as here shown, by Mrs. Crees. The spinning of the cotton does not present any more difficulty than spinning wool, and the resulting yarn can be utilised for many domestic and artistic articles.

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## TANNING KANGAROO SKINS.

Hair may be removed from skins before tanning by soaking in lime water for several days, or the skins may be folded together, when fresh, and kept warm, so that they will begin to putrefy. Each of these processes will loosen the hair, which may then be scraped off with a knife. All skins may be treated in the same manner. In actual tanning with wattle or other bark, various strengths are used, beginning with a weak solution of the bark and finishing up with a saturated solution, in which chopped bark is often packed between the layers of skins as they are placed in the final pit or tub. Strengths are gauged not by the amount of bark used, as the tanning content varies greatly in different samples of the same variety, but by testing the specific gravity of the solution.

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## THREE HUNDRED AND SIX CENTURIES LOST BY STRIKES.

In nine months we lost 306 centuries through strikes in one State. So appalling are the figures that one might doubt their accuracy if they came from a source less reliable than the State Industrial Commission of New York. The report gives the details of this enormous waste.

During the period from October 1, 1915, to June 30, 1916, there were 328 strikes reported, involving directly 222,325 persons who lost 8,144,438 days and indirectly 31,629 persons were thrown out of employment for 1,466,725 days, making a total of 9,581,163 days' lost time.

This is a most striking proof that we deserve the title of Industrial Wasters of the World. The responsibility for this loss is not easily placed; a strike too often is the result of a combination of circumstances. But if, when a strike seems imminent, both employer and labourers would consider the total loss to our nation, we might be able to save a few centuries, and thus preserve our most valuable commodity—time.—"American Industries."

[And a still more valuable commodity—the hearths and homes of the strikers' families.—ED. "Q.A.J."]

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## SOCIETIES, SHOW DATES, ETC.

Coorparoo.—Coorparoo Progress, Horticultural, and Industrial Association. Show date: 31st August, 1918. W. D. Dell, secretary.

Malanda.—Eacham P.A. and I. Society. The show was postponed from 29th and 30th August to 26th and 27th September.

Innisfail.—Johnstone River Agricultural Society. Show date: 21st and 22nd September. T. Nisbet, secretary.

Woodford.—Woodford District Fruit Growers' Association. H. Cameron Cowie, secretary.

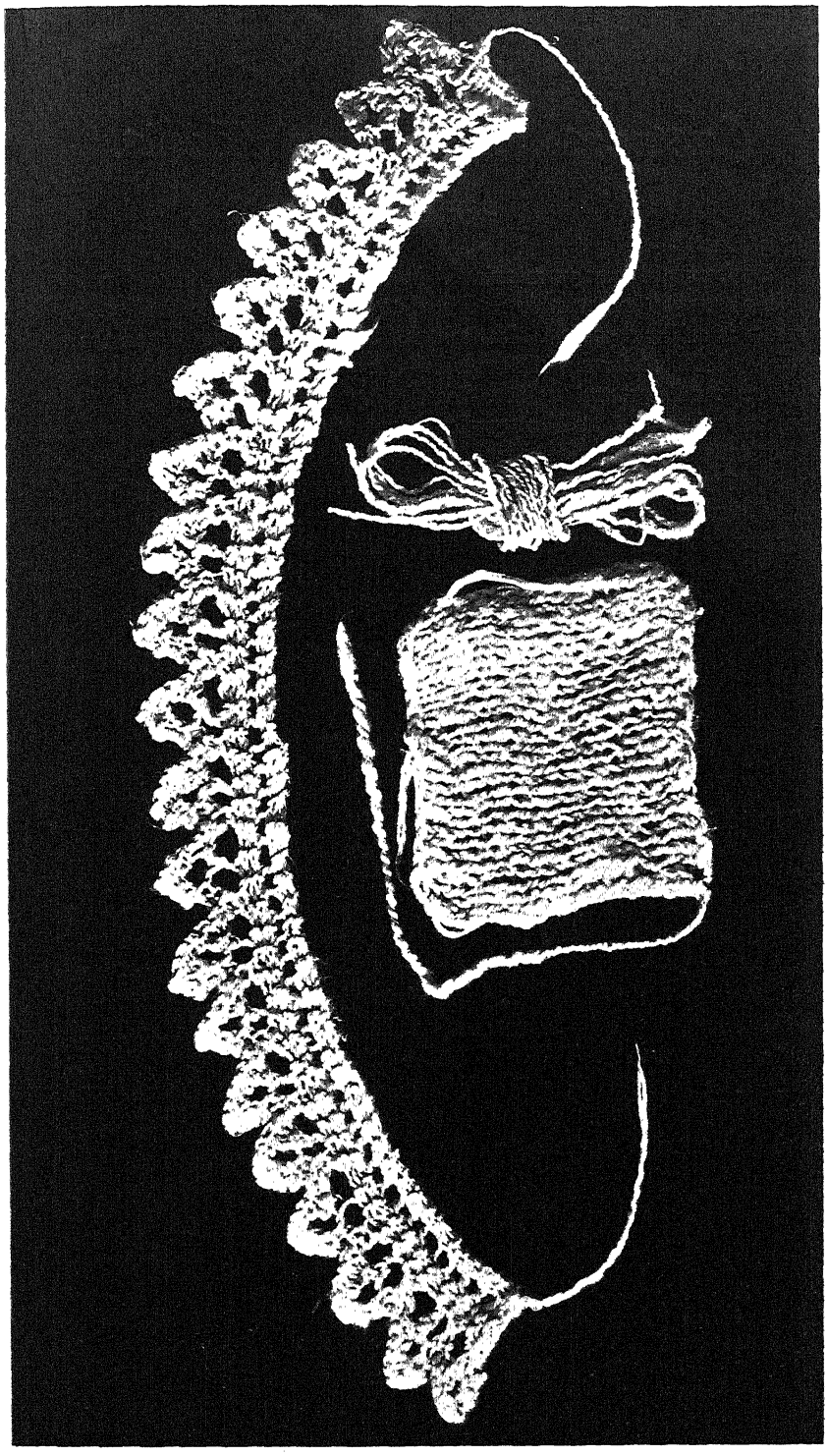


Plate 32.—Crochet Work on the Farm, from Home-grown Cotton.

# Answers to Correspondents.

## GOPHERS.

"FARMER"—

Gophers are always mentioned in American agricultural journals, as they are very important enemies of agriculture. The ground squirrel usually is called a gopher, although the term should be reserved for an entirely different family of mammals—the pocket gophers. Five species of the ground squirrel are found in the valley of the Mississippi River and its tributaries, and everywhere they are recognised as a pest of agriculture on account of their habit of feeding on pasture grasses and grain, of which latter crops they consume vast quantities. They also do much damage (as do moles in Europe) on account of the large mounds they throw up in digging their burrows. Their flesh, like that of our Australian bandicoot, is tender and of a delicate flavour. They are usually destroyed by the use of carbon bisulphide.

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## THE QUEENSLAND GIANT RAT.

Mr. A. M. MacDiarmid, Crow's Nest, writes:—"I have just read in the "Queensland Agricultural Journal" your notes on "The Queensland Giant Rat" which Mr. H. A. Longman states is found in North-eastern Australia. I thought that you would be interested to know that a specimen of the same species of rat was found here a few weeks ago. It was found amongst a quantity of firewood that had been cut into blocks and had been stacked up for some months. The men that found it did not know what it was and brought it into town alive. The writer very quickly found it had teeth, as when he was examining it, the rat bit him right through the finger. Needless to say the rat did not stay alive very long. It is the first of the kind ever caught here to the writer's knowledge. Your notes upon the matter have now cleared the mystery up, as no one knew what it was before."

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR SEPTEMBER, 1917.

| Article. | | SEPTEMBER. |
|---|---|---|
| | | Prices. |
| Bacon | lb. | 9½d. to 10d. |
| Barley | bush. | 2s. to 5s. 6d. |
| Barley (Local) | ,, | 1s. 6d. to 2s. 2d. |
| Bran | ton | £5 15s. |
| Broom Millet | ,, | £18 to £25 |
| Butter (1st Grade) | cwt. | 158s. 8d. |
| Chaff, Mixed | ton | £5 12s. |
| Chaff, Oaten | ,, | £5 10s. to £5 15s. |
| Chaff, Lucerne | ,, | £3 10s. to £7 10s. |
| Chaff, Wheaten | ,, | £1 10s. to £3 15s. |
| Cheese | lb. | 9½d. |
| Flour | ton | £12 |
| Hams | lb. | 1s. 3d. to 1s. 4d. |
| Hay, Oaten | ton | £6 15s. to £7 15s. |
| Hay, Lucerne | ,, | £4 15s. to £5 |
| Honey | lb. | 3½d. to 4d. |
| Maize | bush. | 2s. 6½d. to 2s. 9½d. |
| Oats | ,, | 1s. 6d. to 2s. 6d. |
| Onions | ton | £12 to £14 |
| Peanuts | lb. | 3½d. to 4d. |
| Pollard | ton | £5 5s. |
| Potatoes | ,, | £6 15s. to £8 |
| Potatoes (Sweet) | sug. bag | 1s. 6d. to 2s. |
| Pumpkins (Cattle) | ton | £2 10s. to £2 12s. |
| Eggs | doz. | 9½d. to 10½d. |
| Fowls | per pair | 4s. to 6s. 6d. |
| Ducks, English | ,, | 3s. 6d. to 4s. |
| Ducks, Muscovy | ,, | 4s. to 6s. 9d. |
| Ducks, Wild | ,, | 3s. 6d. |
| Geese | ,, | 7s. to 8s. |
| Turkeys (Hens) | ,, | 9s. 9d. to 13s. 4d. |
| Turkeys (Gobblers) | ,, | 14s. to 18s. 6d. |
| Wheat (Milling) | bush. | 2s. 6d. to 3s. |
| Hares (Alive) | pair | 15s. |
| Hares (Dead) | ,, | 5s. |

## VEGETABLES—TURBOT STREET MARKETS.

| | |
|---|---|
| Cabbages, per dozen | 4s. to 7s. |
| Cauliflowers, per dozen | 7s. to 10s. |
| Celery, per bundle | ... |
| Beans, per sugar bag | 8s. to 12s. |
| Peas, per sugar bag | 9s. to 12s. |
| Carrots, per dozen bunches | 1s. 3d. to 1s. 9d. |
| Chocos, per quarter-case | ... |
| Beetroot, per dozen bunches | 1s. to 1s. 3d. |
| Lettuce, per dozen | 1s. to 2s. |
| Marrows, per sack | 3s. to 4s. |
| Parsnips, per bundle | 7d. to 10d. |
| Sweet Potatoes, per sugar bag | 1s. 6d. to 2s. |
| Table Pumpkins, per dozen | 4s. to 5s. |
| Tomatoes, per quarter-case | 4s. to 7s. |
| Rhubarb, per dozen bundles | ... |

## SOUTHERN FRUIT MARKETS.

| Article. | SEPTEMBER. Prices. |
|---|---|
| Bananas (Queensland), per case ... | 8s. to 11s. |
| Bananas (Tweed River), per case... | ... |
| Bananas (Fiji), per case ... | 18s. to 20s. |
| Bananas (G.M.), per bunch | ... |
| Bananas (G.M.), per case ... | ... |
| Guavas, per case ... | ... |
| Lemons (Local), per bushel-case ... | 2s. to 4s. 6d. |
| Mandarins, per case ... | 2s. to 6s. |
| Oranges (Navel), per case | 8s. to 12s. |
| Oranges (Queensland), per case ... | 6s. to 10s. |
| Papaw Apples, per half-bushel-case | 7s. to 10s. |
| Passion Fruit, per half-case ... | 1s. 6d. to 6s. |
| Pineapples (Queens), per double-case ... | 4s. 6d. to 7s. |
| Pineapples (Common), per double-case ... | 4s. 6d. to 6s. |
| Tomatoes, half-bushel-case ... | 3s. to 5s. |
| Strawberries (Queensland), per tray | 4s. to 6s. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | SEPTEMBER. Prices. |
|---|---|
| Apples, Eating, per case ... | 12s.to 14s. |
| Apples, Cooking, per case... | 13s. |
| Bananas (Cavendish), per dozen ... | 3d. to 4d. |
| Bananas (Sugar), per dozen | 2d. to 3d. |
| Cape Gooseberries, per quarter-case | 7s. to 10s. |
| Citrons, per hundredweight | 10s. |
| Cocoanuts, per sack ... | 12s. to 15s. |
| Cumquats, per quarter-case | 3s. to 3s. 6d. |
| Custard Apples, per tray ... | 4s. to 6s. |
| Lemons (Lisbon), per tray... | 6s. to 7s. |
| Limes, per tray ... | ... |
| Mandarins, large, per tray | 7s. to 9s. |
| Oranges (Navel), per case ... | 9s. to 10s. |
| Oranges (Seville), per hundredweight | 11s. |
| Oranges (other), per case ... | 3s. 6d. to 4s. |
| Papaw Apples, per quarter-case ... | 2s. to 5s. |
| Passion Fruit, per half-case | 4s. to 6s. |
| Pears, per half-case | ... |
| Peanuts, per lb. ... | 3½d. to 4d. |
| Persimmons, per quarter-case | ... |
| Pineapples (Ripleys), per dozen ... | 6d. to 1s. 9d. |
| Pineapples (Rough), per dozen ... | 6d. to 1s. 6d. |
| Pineapples (Smooth), per dozen ... | 1s. 6d. to 3s. 6d. |
| Strawberries, per dozen boxes ... | 6s. to 22s. |
| Tomatoes, per quarter-case ... | 5s. to 8s. |

## TOP PRICES, ENOGGERA YARDS, AUGUST, 1917.

| Animal. | AUGUST. Prices. |
|---|---|
| Bullocks | £25 15s. to £26 10s. |
| Bullocks (Single) | £29 5s. |
| Cows | £15 15s. to £18 5s. |
| Merino Wethers | 46s. 9d. |
| Crossbred Wethers | 48s. 9d. |
| Merino Ewes | 34s. 6d. |
| Crossbred Ewes | 40s. 9d. |
| Lambs | 38s. 9d. |
| Pigs (Porkers) | 63s. |

## EXHIBITION FAT STOCK SALES.

| Animal. | AUGUST. Prices. |
|---|---|
| Bullocks | £23 to £29 15s. |
| Bullocks (Guessing) | £28 |
| Bullocks (Champion) | £34 15s. |
| Bullocks (Heaviest Live Weight) | £35 |
| Cows | £18 5s. to £22 10s. |
| Cows (Champion) | £25 10s. |
| Merino Wethers | 51s. |
| Crossbred Wethers | 61s. |
| Crossbred Ewes | 60s. |
| Lambs | 43s. |

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF AUGUST, 1917, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING AUGUST, 1917 AND 1916, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | Aug. | No. of Years' Records. | Aug., 1917. | Aug., 1916. |
| *North Coast.* | In. | | In. | In. |
| Atherton ... ... | 0·87 | 15 | 1·70 | 0·66 |
| Cairns ... ... | 1·85 | 34 | 2·78 | 1·64 |
| Cardwell ... ... | 1·26 | 44 | 1·28 | 2·79 |
| Cooktown ... ... | 1·46 | 40 | 0·79 | 0·93 |
| Herberton ... ... | 0·64 | 29 | 1·44 | 0·79 |
| Ingham ... ... | 1·34 | 24 | 1·73 | 2·36 |
| Innisfail ... ... | 5·27 | 35 | 16·82 | 3·08 |
| Mossman ... ... | 1·80 | 5 | 1·26 | 1·82 |
| Townsville ... ... | 0·41 | 45 | 2·07 | 0·63 |
| *Central Coast.* | | | | |
| Ayr ... ... ... | 0·38 | 29 | 3·05 | 0·63 |
| Bowen ... ... | 0·63 | 45 | 3·05 | 0·92 |
| Charters Towers ... | 0·37 | 34 | 2·03 | 1·91 |
| Mackay ... ... | 0·98 | 45 | 4·58 | 0·85 |
| Proserpine ... ... | 0·89 | 13 | 4·18 | 0·72 |
| St. Lawrence ... | 0·89 | 45 | 1·78 | 1·17 |
| *South Coast.* | | | | |
| Biggenden ... ... | 1·18 | 17 | 1·63 | 2·42 |
| Bundaberg ... ... | 1·43 | 33 | 1·14 | 2·36 |
| Brisbane ... ... | 2·25 | 66 | 1·03 | 1·73 |
| Childers ... ... | 1·26 | 21 | 1·28 | 2·00 |
| Crohamhurst ... | 2·43 | 25 | 3·61 | 5·19 |
| Esk ... ... ... | 1·70 | 29 | 0·78 | 1·53 |
| Gayndah ... ... | 1·26 | 45 | 0·85 | 2·04 |
| Gympie ... ... | 1·89 | 46 | 1·75 | 3·88 |
| Glasshouse M'tains | 1·62 | 8 | 2·04 | 3·14 |
| Kilkivan ... ... | 1·62 | 37 | 0·65 | 2·41 |
| Maryborough ... | 1·79 | 45 | 2·35 | 2·66 |

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | Aug. | No. of Years' Records. | Aug., 1917. | Aug., 1916. |
| *South Coast*—continued: | In. | | In. | In. |
| Nambour ... ... | 1·89 | 20 | 2·28 | 4·54 |
| Nanango ... ... | 1·51 | 34 | 0·79 | 1·25 |
| Rockhampton ... | 0·92 | 29 | 3·41 | 2·03 |
| Woodford ... ... | 1·98 | 29 | 1·34 | 2·97 |
| *Darling Downs.* | | | | |
| Dalby ... ... | 1·26 | 46 | 1·05 | 2·01 |
| Emu Vale ... ... | 1·25 | 20 | 0·68 | 1·96 |
| Jimbour ... ... | 1·36 | 28 | 0·71 | 1·12 |
| Miles ... ... | 1·30 | 31 | 0·78 | 1·33 |
| Stanthorpe ... | 1·95 | 43 | 0·83 | 2·26 |
| Toowoomba ... | 1·83 | 44 | 1·89 | 2·22 |
| Warwick ... ... | 1·55 | 29 | 0·99 | 1·92 |
| *Maranoa.* | | | | |
| Roma ... ... | 0·97 | 42 | 0·89 | 1·56 |
| *State Farms, &c.* | | | | |
| Bungeworgorai ... | 0·75 | 5 | 1·02 | 1·51 |
| Gatton College ... | 1·33 | 17 | 0·82 | 1·79 |
| Gindie ... ... | 0·66 | 17 | 3·27 | 1·06 |
| Hermitage ... | 1·53 | 10 | 0·82 | 2·13 |
| Kairi ... ... | 0·87 | 5 | 1·67 | 0·55 |
| Kamerunga ... | 1·51 | 26 | 2·51 | 2·08 |
| Sugar Experiment Station, Mackay | 0·77 | 19 | 3·96 | 1·30 |
| Warren ... ... | 1·13 | 5 | 3·06 | 2·40 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for August this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

# ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

## TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON.

| 1917. | SEPTEMBER. | | OCTOBER. | | NOVEMBER. | | DECEMBER. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·2 | 5·34 | 5·29 | 5·47 | 4·59 | 6·5 | 4·46 | 6·28 |
| 2 | 6·1 | 5·34 | 5·28 | 5·48 | 4·58 | 6·6 | 4·46 | 6·28 |
| 3 | 6·0 | 5·35 | 5·27 | 5·48 | 4·58 | 6·7 | 4·46 | 6·29 |
| 4 | 5·59 | 5·35 | 5·26 | 5·49 | 4·57 | 6·7 | 4·46 | 6·30 |
| 5 | 5·58 | 5·36 | 5·25 | 5·49 | 4·57 | 6·8 | 4·46 | 6·31 |
| 6 | 5·57 | 5·36 | 5·24 | 5·50 | 4·56 | 6·9 | 4·46 | 6·32 |
| 7 | 5·55 | 5·36 | 5·23 | 5·50 | 4·55 | 6·9 | 4·46 | 6·32 |
| 8 | 5·54 | 5·37 | 5·22 | 5·51 | 4·54 | 6·10 | 4·46 | 6·33 |
| 9 | 5·53 | 5·37 | 5·20 | 5·51 | 4·54 | 6·11 | 4·47 | 6·33 |
| 10 | 5·52 | 5·38 | 5·19 | 5·52 | 4·53 | 6·11 | 4·47 | 6·34 |
| 11 | 5·51 | 5·38 | 5·18 | 5·52 | 4·52 | 6·12 | 4·47 | 6·34 |
| 12 | 5·50 | 5·39 | 5·17 | 5·53 | 4·52 | 6·13 | 4·47 | 6·35 |
| 13 | 5·49 | 5·39 | 5·16 | 5·53 | 4·51 | 6·14 | 4·47 | 6·35 |
| 14 | 5·48 | 5·40 | 5·15 | 5·54 | 4·51 | 6·15 | 4·48 | 6·36 |
| 15 | 5·47 | 5·40 | 5.14 | 5·54 | 4·50 | 6·16 | 4·48 | 6·36 |
| 16 | 5·45 | 5·41 | 5·13 | 5·55 | 4·50 | 6·17 | 4·48 | 6·37 |
| 17 | 5·44 | 5·41 | 5·12 | 5·55 | 4·49 | 6·18 | 4·48 | 6·38 |
| 18 | 5·43 | 5·42 | 5·11 | 5·56 | 4·49 | 6·19 | 4·49 | 6·39 |
| 19 | 5·42 | 5·42 | 5·10 | 5·56 | 4·48 | 6·19 | 4·49 | 6·40 |
| 20 | 5·41 | 5·42 | 5.9 | 5·57 | 4·48 | 6·20 | 4·50 | 6·40 |
| 21 | 5·40 | 5·43 | 5·8 | 5·57 | 4·47 | 6·21 | 4·50 | 6·41 |
| 22 | 5·39 | 5·43 | 5·7 | 5·58 | 4·47 | 6·22 | 4·51 | 6·42 |
| 23 | 5·37 | 5·44 | 5·6 | 5·59 | 4·47 | 6·22 | 4·51 | 6·42 |
| 24 | 5·36 | 5·44 | 5·5 | 5·59 | 4·47 | 6·23 | 4·52 | 6·43 |
| 25 | 5·35 | 5·45 | 5·4 | 6·0 | 4·47 | 6·24 | 4·52 | 6·43 |
| 26 | 5·34 | 5·45 | 5·3 | 6·0 | 4·46 | 6·24 | 4·53 | 6·43 |
| 27 | 5·33 | 5·45 | 5·3 | 6·1 | 4·46 | 6·25 | 4·53 | 6·44 |
| 28 | 5·32 | 5·46 | 5·2 | 6·1 | 4·46 | 6·26 | 4·54 | 6·44 |
| 29 | 5·31 | 5·46 | 5·1 | 6·2 | 4·46 | 6·26 | 4·55 | 6·44 |
| 30 | 5·30 | 5·47 | 5·0 | 6·3 | 4·46 | 6·27 | 4·56 | 6·45 |
| 31 | ... | ... | 5·0 | 6·4 | 4·46 | ... | 4·57 | 6·45 |

The times given are for the whole of Queensland, New South Wales, and Victoria, where the same Standard Time is observed.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 1 Sept. | ○ | Full Moon | 10 | 28 | p.m. |
| 8 „ | ☽ | Last Quarter | 5 | 5 | „ |
| 16 „ | ● | New Moon | 8 | 28 | „ |
| 24 „ | ☾ | First Quarter | 3 | 41 | „ |

The Moon will be at its greatest distance from the earth at midnight on the 14th, and at its least distance on the night of the 30th.

| | | | | | |
|---|---|---|---|---|---|
| 1 Oct. | ○ | Full Moon | 6 | 31 | a.m. |
| 8 „ | ☽ | Last Quarter | 6 | 14 | p.m. |
| 16 „ | ● | New Moon | 12 | 41 | „ |
| 24 „ | ☾ | First Quarter | 12 | 38 | a.m. |
| 30 „ | ○ | Full Moon | 4 | 19 | p.m. |

The moon will be furthest from the earth on the 12th, and nearest to it on the 28th.

| | | | | | |
|---|---|---|---|---|---|
| 7 Nov. | ☽ | Last Quarter | 3 | 4 | a.m. |
| 15 „ | ● | New Moon | 4 | 28 | „ |
| 22 „ | ☾ | First Quarter | 8 | 29 | „ |
| 29 „ | ○ | Full Moon | 4 | 41 | „ |

The Moon will be furthest from the earth on the 9th, and nearest to it on the 24th.

| | | | | | |
|---|---|---|---|---|---|
| 7 Dec. | ☽ | Last Quarter | 12 | 14 | a.m. |
| 14 „ | ● | New Moon | 7 | 17 | p.m. |
| 21 „ | ☾ | First Quarter | 4 | 7 | „ |
| 28 „ | ○ | Full Moon | 7 | 52 | „ |

The Moon will cause an *Annular Eclipse* of the *Sun* on December 14th, but it will not be visible in Queensland. On the 28th there will be a *Total Eclipse* of the *Moon* between 7.38 and 7.55 p.m. It will be partly eclipsed for an hour and a-half before and after totality.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during September, October, and November, may be roughly arrived at by adding 16 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

# Farm and Garden Notes for November.

FIELD.—Under ordinarily favourable conditions, harvesting the wheat and barley crops may now begin. Those who have oats for hay should cut it when the grain has formed, but before it is ripe, for then the plant is in its most nourishing condition. Destroy caterpillars on tobacco plants, and top the latter so as to throw all the strength into the leaves. Keep down the weeds, which will now try to make headway; earth up any growing crops requiring the operation; sow maize, imphee, setaria, kafir corn, teosinte, sorghum, cotton, &c. Plant sweet potatoes, sisal hemp, yams, peanuts, and ginger.

KITCHEN GARDEN.—Why do so few gardeners and farmers grow their own vegetables? This is a question frequently asked by visitors to the farming districts. The reason probably is, that vegetables require a good deal of care and attention, which means also a good deal of time taken from the ordinary farm work. In many cases it pays the farmer better to buy many kinds of vegetables than to grow them himself. The only vegetables grown on many fine farms are cabbages and pumpkins, not to class potatoes under the head. Many people have an idea that European vegetables cannot be grown during the hot summer months, but this is a great fallacy: the Chinese gardeners supply the towns with all kinds of vegetables, except, perhaps, cauliflowers, during the whole of the summer. It is, therefore, clear that, by constant work, plenty of manure, water, and some shade for seedlings, most vegetables can be produced during the hot months from November to March. If your ground has been trenched or deeply dug and well worked, the advantages will be seen during the coming months. It does not pay to work shallow-dug ground. When sowing and planting during this month, give plenty of room between the rows and the plants; otherwise they will be drawn up and worthless, and keep the ground open by constant forking and hoeing. Thin out melon and cucumber plants. It is a good plan to peg down the vines: they will then not be blown about by the wind; they will take root at intervals, and thus help the main stalk. Give plenty of water to tomatoes planted out last month. They should also be mulched. Sow cabbage, French beans, melons, lettuce, radishes, pumpkins, cucumbers, marrows, rosellas, &c., and transplant for succession in calm, cloudy weather.

FLOWER GARDEN.—Stake any dahlias which may be now above ground, and plant out the bulbs which were stored in a moist place. If the weaker bulbs are reserved, they will come in for autumn planting. Take up all bulbs which have done flowering, and store them in a dry place. Winter-flowering plants will have gone off almost; still, the garden should be in full bloom, and will well repay the trouble bestowed on it, and a little fertiliser given as a top-dressing will assist the plants to bloom and look well for a longer time than if they were neglected. Give weak liquid manure to chrysanthemums, and allow no suckers to grow till the plants have done flowering. Take up narcissi. Do not store them, but plant them at once in new situations. Sow antirrhinum, balsam, zinnia, summer chrysanthemum, calliopsis, and nemophila.

# Orchard Notes for November.

## THE SOUTHERN COAST DISTRICTS.

November is somewhat of an off month for fruit, as the crop of strawberries is about over; pineapples, with the exception of a few off season fruit, are not ready for marketing; and citrus fruits of all sorts, with the exception of those grown in the latest districts, are now over. Bananas should, however, be improving, particularly if the season is favourable.

The most important work of the month is the cultivation of the orchard, as, in order to retain moisture in the soil, it is essential that the soil be kept in a fine state of tilth. Where the land is liable to wash, breaks should be left between the fine-worked land, or, even better, a good break of cowpea or other leguminous crop, valuable for producing nitrogen and humus, should be grown. All fruit pests should be attended to; cyaniding can be carried out where necessary, and is especially useful now in the case of the Red, Purple, Mussel, Circular Black, and Glover Scales. Fruit fly should be systematically fought; all infested plums, peaches, guavas, or other fruits should be gathered and destroyed, so as to prevent the spread of the pest. Sucking bugs of all sorts should be gathered and destroyed, the egg-clusters as well as the immature and mature insects, being destroyed. Hand-gathering is as good a plan as any. Fig beetles should be destroyed by spraying with Kedzie's mixture; and the egg-custers should be destroyed whenever found.

Bananas and pineapples can be planted during the month, taking care, in the case of the pineapples, not to set out suckers that will immediately throw out a fruit, but those that will become firmly established before they fruit. Examine the vineyard carefully, and keep it well worked. Look out for Oïdium and Black Spot, and treat for same as recommended in the Orchard Notes of the two previous months.

Early ripening grapes will be reaching maturity towards the end of the month; but few, if any, will be ripe. In any case do not market too immature fruit; rather wait a few days longer, till it is fit to eat.

## THE TROPICAL COAST DISTRICTS.

The main crop of pineapples will ripen during the month; and if gathered at the right time—viz., when fully developed, but not turned colour—they will carry all right South, if carefully handled and well packed. Papaws and granadillas are still in season, and will meet with a good Southern demand; they must be packed in cases containing only a single layer of fruit, and should be sent in the cool chamber. I am

certain that a good market can be got for these fruits in both Melbourne and Sydney, particularly at this time of the year, when their winter fruits are off and their summer fruits are not yet on.

Watch bananas carefully for fly. Keep the orchards well cultivated.

Only ship good mangoes South: for too much rubbish is sent to Brisbane. Good mangoes will pay to pack properly, but the common sorts, which predominate to an enormous extent, will barely pay freight, if there is a good crop. The canning of good types of fibreless mangoes of good flavour is well worth taking up commercially in the North, as a ready sale for the canned fruits can be obtained.

As in the Southern Coast districts, all fruit pests should be systematically fought, and the orchard should be kept in good state of tilth, as, once the wet season starts, there is little chance of cleaning up weeds and rubbish of all kinds, or of cultivating and sweetening the soil.

## THE SOUTHERN AND CENTRAL TABLELANDS.

The earlier kinds of summer fruits, such as cherries, will ripen during the month. See that, if fruit fly makes it appearance, it is systematically fought.

Look out for Codling Moth, and continue the sprayings with Kedzie's mixture.

Look out carefully for any San José scale that may have escaped the winter spraying, as, if the trees are sprayed whilst the young are hatching out, the bulk of the insects are killed and little damage is done either to tree or fruit.

The sulphide of soda spray is one of the best to use now. Keep Woolly Aphis in check, should it make its appearance, using the resin washes; or, if it and San José scale are both present, use the sulphide of soda spray.

Watch the vineyards carefully for Black Spot and Oïdium. Keep the orchard and vineyard well cultivated, so as to retain all the moisture in the soil required for the growth of the tree and development of the fruit. In the warmer parts, irrigate when necessary, following the irrigation by deep and systematic cultivation.

See that grape vines have plenty of foliage to protect the ripening fruit from sun scald, but yet not so dense a foliage as to induce Oïdium or Black Spot. Look out for Red Scale on citrus trees, and cyanide to check same. Look out for fruit fly in the early ripening fruits, and gather and destroy all that may be so affected.

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# Pastoral.

## TICKS.

### THE "CASH VALUE" OF DIPPING OR SPRAYING CATTLE TO FREE THEM FROM TICKS. IMPORTANT OFFICIAL EVIDENCE OF IMMENSE GAINS SECURED AND ENORMOUS LOSSES AVOIDED BY FREEING CATTLE FROM TICKS.

In order to secure some direct evidence from stock-owners regarding the benefits derived from the tick-eradication work carried on in the Southern States of North America, a circular was sent out to a large number of representative cattle-owners by the Department of Agriculture, asking for replies to various specific questions concerning the results of the work. The questions are given below, with their summarised answers. These afford most impressive evidence, not only of enormous losses prevented but also of immense gains obtained by the dipping of animals to free them of ticks.

Question.—What were the approximate annual losses of cattle from tick-borne diseases before the tick-eradication work was started? Answer: 15·3 per cent.

Question.—What has been the annual loss of cattle from tick-borne diseases since tick eradication started? Answer: 1·3 per cent.

*Note.*—The answer to this question should be compared with that to the first question, when it will be seen that the tick-eradication work has resulted in the losses being reduced from 15·3 per cent., *i.e.*, practically to vanishing point.

Question.—What was the average value of three-year-old steers in your county before the tick-eradication work was started? Answer: 16 dollars 15 cents (£3 7s.).

Question.—What is the average value of three-year-old steers now? Answer: 25 dollars 28 cents (£5 5s.).

*Note.*—In comparing the replies to the two preceding questions, allowance has to be made for the recent general advance in the price of cattle. When this is done, the result shows that there still remains an appreciation in value of 40 per cent. which can be properly said to be due to the absence of ticks.

Question.—Is there any difference between the average weight of cattle now and the average weight before tick eradication was started? How much? Answer: Yes. Average increase, 22 per cent.; average weight increase, 116 lb.

*Note.*—Taking the value of the animals at 3½ cents (1¾d.) per lb. (the average for three-year-old steers), the average gain, due to dipping, works out at 4 dollars (16s. 8d.) per head.

The above figures prove beyond all doubt that the cost of freeing cattle from ticks is not an "expense," but an "investment," which brings in most excellent "interest" in the form of a greatly increased value of animals treated.—"Journal of the Jamaica Agricultural Society."

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## £10,600 FOR A BULL CALF.

There was a sale of Holsteins at Worcester, Mass. (U.S.A.), recently, to which our American exchanges devote much space. Almost-incredible bids were registered, and 143 head sold for £60,000, an average of nearly £420.

"Kimball's Dairy Farmer" says that world-record animals were in evidence all the time, and world-record prices were paid with such abandon as to make an ordinary mortal dizzy.

A five-months-old bull calf, King Ormsby Jane Rag Apple, whose sire is the great bull, Rag Apple Korndyke 8th, and whose dam is Ormsby Jane Segis Aaggie, with a butter record of 46·33 lb. in seven days, sold for £10,600, the highest price ever paid for a bull.

The four-year-old heifer Wandermeere Belle Hengerveld (42·61 lb. of butter in seven days as a four-year-old) sold for £3,650. Two years ago this heifer was bought for £125.

Another cow sold for £3,600—Glen Alex Queen De Kol, the world's record two-year-old, that made 42·35 lb. of butter in seven days.

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## BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| P. Young .. .. | Talgai West, Ellinthorp | 2 | 42 | Milking Shorthorn Herd Book of Queensland |
| L. H. Paten .. .. | "Jeyendel," Calvert, S. & W. Line | 8 | 21 | Ayrshire Herd Book of Queensland |
| F. C. G. Gratton .. | "Towleston," Kingsthorpe | 2 | 14 | Holstein Cattle Club Herd Book |
| T. Mullen .. .. | "Norwood," Chelmer | 3 | 20 | Queensland Jersey Herd Book |
| J. H. Paten .. .. | Yandina .. .. | 6 | 21 | Ayrshire Herd Book of Queensland |
| Queensland Agricultural College | Gatton .. .. | 4 | 38 | Ayrshire Herd Book of Queensland |
| | | .. | 2 | Ayrshire Herd Book of Scotland |
| | | 2 | 9 | Holstein-Friesian Herd Book of Australia |
| | | 2 | 31 | Jersey Herd Book of Queensland |
| J. W. Paten .. .. | Wanora, Ipswich .. | 10 | 42 | Ayrshire Herd Book of Queensland |
| M. W. Doyle .. .. | Moggill .. .. | 4 | 12 | Queensland Jersey Herd Book |
| G. A. Buss .. .. | Bundaberg .. .. | 1 | 15 | Herd Book of the Jersey Cattle Society of Queensland |
| W. Rudd .. .. | Christmas Creek, Beaudesert | 2 | 10 | Milking Shorthorn Herd Book of Queensland |
| M. F. and R. C. Ramsay | Talgai, Clifton .. | 5 | 27 | Herd Book of the Jersey Cattle Society of Queensland |
| George Newman .. | Wyreema .. .. | 9 | 37 | Holstein-Friesian Herd Book of Australia |

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| R. Conochie .. .. | Brooklands, Tingoora | 9 | 21 | Queensland Jersey Herd Book |
| W. J. Barnes .. .. | Cedar Grove .. | 10 | 37 | Queensland Jersey Herd Book |
| T. B. Murray-Prior .. | Maroon, Boonah .. | 2 | 37 | Queensland Shorthorn and Australian Herd Books |
| W. J. Affleck .. .. | Grasmere, N. Pine .. | 6 | 31 | Queensland Jersey Herd Book |
| A. J. McConnel .. | Dugandan, Boonah | 19 | 36 | Australian Hereford Herd Book |
| A. Pickels .. .. | Blackland's Stud Farm, Wondai | 4 | 62 | Illawarra Dairy Cattle Herd Book of Queensland |
| G. C. Clark .. .. | East Talgai, Ellinthorp | 3 | 7 | New Zealand Herd Book |
| H. D. B. Cox .. .. | Sydney (entered brother's name) | 3 | 16 | Commonwealth Standard Jersey Herd Book |
| J. T. Perrett and Son | Coolabunia .. .. | 2 | 36 | Illawarra Herd Book of Queensland |
| State Farm .. .. | Kairi .. .. | 4 | 8 | Ayrshire Herd Book of Queensland |
| | | 1 | 2 | Holstein-Friesian Herd Book of Australia |
| E. M. Lumley Hill .. | Bellevue House, Bellevue | 45 | 127 | Australian Hereford Herd Book |
| W. F. Savage .. .. | Ramsay .. .. | 1 | 12 | Illawarra Herd Book of Queensland |
| Tindal and Son .. | Gunyan, Inglewood | 50 | 400 | Australian Hereford Herd Book |
| J. N. Waugh and Son | Prairie Lawn, Nobby | 3 | 28 | Queensland Jersey Herd Book |
| J. H. Fairfax .. .. | Marinya, Cambooya (2) | 9 | 55 | Ayrshire Herd Book of Queensland |
| C. E. McDougall .. | Lyndhurst Stud, Warwick (2) | 25 | 100 | Queensland Shorthorn Herd Book |
| J. Holmes .. .. | "Longlands," Pittsworth | 6 | 20 | Ayrshire Herd Book of Queensland |
| P. Biddles .. .. | Home Park, Netherby | 1 | 20 | Illawarra Dairy Cattle Association |
| A. Rodgers .. .. | Torran's Vale, Lanefield | 1 | 9 | Milking Shorthorn Herd Book |
| R. S. Alexander .. | Glenlomond Farm, Coolumboola | 1 | .. | Holstein-Friesian Herd Book of Queensland |
| | | 2 | .. | Holstein-Friesian Herd Book of Australia |
| State Farm .. .. | Warren .. .. | 3 | 83 | Ayrshire Herd Book of Queensland |
| S. H. Hosking.. .. | Toogooloowah .. | 2 | 15 | Holstein Cattle Club Herd Book |
| W. J. H. Austin .. | Hadleigh Jersey Herd, Boonah | 1 | 2 | Queensland Jersey Herd Book |
| Ditto .. .. | ditto .. .. | .. | 6 | Commonwealth Standard Herd Book |
| H. M. Hart .. .. | Glen Heath Stud, Yalangur | 7 | 21 | Ayrshire Herd Book of Queensland |
| C. Behrendorff .. | Inavale Stud Farm, Boonah | 3 | 9 | Holstein-Friesian Herd Book of Queensland |
| F. A. Stimpson .. | Ayrshire Stud Farm, Fairfield, South Brisbane | 17 | 68 | Ayrshire Herd Book of Queensland |

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, SEPTEMBER, 1917.

The total number of eggs laid for the month was 9,505. Very changeable weather has been experienced, including heavy rains which caused some discomfort to the birds. Broodies have been troublesome amongst the heavy breeds. Mr. J. M. Manson's pen put up the highest score in the light breeds with 159, with E. Chester second with 152 eggs. In the heavy section, E. A. Smith leads with 151 and R. Burns and W. Smith tie for second place with 149 eggs. E. A. Smith and E. F. Dennis are equal, with 29 each, for highest individual score for the single-pen test. The Dixie Egg Plant's barren hen (F.) was removed and another bird substituted. The following are the individual records:—

| Competitors. | Breed. | Sept. | Total. |
|---|---|---|---|
| | LIGHT BREEDS. | | |
| E. Chester ... ... ... ... ... | White Leghorns ... | 153 | 792 |
| *G. H. Turner ... ... ... ... | Do. ... ... | 142 | 705 |
| G. Chester ... ... ... ... ... | Do. ... ... | 145 | 679 |
| W. Becker... ... ... ... ... | Do. ... ... | 121 | 676 |
| F. W. Leney ... ... ... ... | Do. ... ... | 140 | 674 |
| C. Porter ... ... ... ... ... | Do. ... ... | 140 | 671 |
| W. R. Crust ... ... ... ... | Do. ... ... | 133 | 664 |
| T. A. Pettigrove, Victoria ... ... | Do. ... ... | 140 | 655 |
| Moritz Bros., S.A. ... ... ... | Do. ... ... | 134 | 648 |
| Oakland Poultry Farm ... ... ... | Do. ... ... | 133 | 647 |
| *J. M. Manson ... ... ... ... | Do. ... ... | 159 | 642 |
| *J. Zahl ... ... ... ... ... | Do. ... ... | 135 | 623 |
| T. Taylor ... ... ... ... ... | Do. ... ... | 124 | 621 |
| Kelvin Poultry Farm ... ... ... | Do. ... ... | 141 | 619 |
| Quinn's Post Poultry Farm ... ... | Do. ... ... | 148 | 618 |
| *J. R. Wilson ... ... ... ... | Do. ... ... | 126 | 612 |
| J. G. Richter ... ... ... ... | Do. ... ... | 134 | 607 |
| *A. T. Coomber ... ... ... ... | Do. ... ... | 130 | 600 |
| T. B. Hawkins ... ... ... ... | Do. ... ... | 113 | 600 |
| A. Shillig ... ... ... ... ... | Do. ... ... | 140 | 599 |
| J. Fulton ... ... ... ... ... | Do. ... ... | 138 | 597 |
| Mars Poultry Farm ... ... ... | Do. ... ... | 110 | 581 |
| C. Knoblauch ... ... ... ... | Do. ... ... | 124 | 581 |
| *A. W. Bailey ... ... ... ... | Do. ... ... | 114 | 579 |
| *Mrs. J. R. D. Munro ... .. ... | Do. ... ... | 132 | 579 |
| A. H. Padman, S.A. ... ... ... | Do. ... ... | 123 | 579 |
| R. Holmes ... ... ... ... | Do. ... ... | 120 | 550 |
| *Dixie Egg Plant ... ... ... | Do. ... ... | 127 | 541 |
| *T. Fanning ... .. ... ... | Do. ... ... | 142 | 536 |
| F. Clayton, N.S.W. ... ... ... | Do. ... ... | 126 | 535 |

## EGG-LAYING COMPETITION—*continued.*

| Competitors. | Breed. | August. | Total. |
|---|---|---|---|
| **LIGHT BREEDS—*continued.*** | | | |
| J. L. Newton ... ... ... ... | White Leghorns ... | 123 | 531 |
| Mrs. W. D. Bradburne, N.S.W. ... | Do. ... ... | 129 | 530 |
| G. Williams ... ... ... ... | Do. ... ... | 122 | 524 |
| L. G. Innes ... ... ... ... | Do. ... ... | 131 | 522 |
| G. Howard ... ... ... ... | Do. ... ... | 140 | 522 |
| E. Cross ... ... ... ... ... | Do. ... ... | 137 | 515 |
| Miss M. Hinze ... ... ... ... | Do. ... ... | 103 | 503 |
| J. Holmes ... ... ... ... ... | Do. ... ... | 128 | 501 |
| G. J. White ... ... ... ... | Do. ... ... | 127 | 499 |
| *A. E. Walters ... ... ... ... | Do. ... ... | 124 | 496 |
| Mrs. S. J. Sear ... ... ... ... | Do. ... ... | 138 | 494 |
| *C. C. Dennis ... ... ... ... | Do. ... ... | 109 | 487 |
| S. C. Chapman ... ... ... ... | Brown Leghorns... ... | 141 | 487 |
| Mrs. Carrutl ers ... ... ... ... | White Leghorns ... | 117 | 481 |
| C. H. Singer ... ... ... ... | Do. ... ... | 131 | 475 |
| C. P. Buchanan ... ... ... ... | Do. ... ... | 135 | 471 |
| E. A. Smith ... ... ... ... | Do. ... ... | 127 | 471 |
| J. Ferguson ... ... ... ... | Do. ... ... | 125 | 470 |
| *Dr. E C. Jennings ... ... ... | Do. ... ... | 121 | 410 |
| **HEAVY BREEDS.** | | | |
| *R. Burns ... ... ... ... ... | Black Orpingtons ... | 149 | 744 |
| A. E. Walters ... ... ... ... | Do. ... ... | 133 | 697 |
| W. Smith ... ... ... ... ... | Do. ... ... | 149 | 696 |
| *Mars Poultry Farm ... ... ... | Do. ... ... | 145 | 671 |
| W. S. Hanson, N.S.W. ... ... | Do. ... ... | 147 | 633 |
| F. A. Claussen ... ... ... ... | Rhode Island Reds ... | 110 | 630 |
| *E. F. Dennis ... ... ... ... | Black Orpingtons ... | 139 | 610 |
| Cowan Bros., N.S.W. ... ... ... | Do. ... ... | 124 | 579 |
| P. C. McDonnell, N.S.W. ... ... | Do. ... ... | 118 | 561 |
| D. Kenway, N.S.W. ... ... ... | Do. ... ... | 102 | 557 |
| Mrs. J. H. Jobling, N.S.W. ... ... | Do. ... ... | 129 | 544 |
| H. Jobling, N.S.W. ... ... ... | Do. ... ... | 116 | 538 |
| *E. A. Smith ... ... ... ... | Do. ... ... | 151 | 515 |
| King and Watson, N.S.W. ... ... | Do. ... ... | 125 | 505 |
| *Oakland Poultry Farm ... ... | Do. ... ... | 129 | 504 |
| C. B. Bertelsmeier, S.A. ... ... .. | Do. ... ... | 142 | 499 |
| R. Burns ... ... ... ... ... | S. L. Wyandottes ... | 120 | 478 |
| E. Morris .. ... ... ... ... | Black Orpingtons ... | 121 | 474 |
| *Kelvin Poultry Farm ... ... ... | Plymouth Rocks ... | 139 | 463 |
| *Miss M. Hinze ... ... ... ... | Black Orpingtons ... | 148 | 462 |
| J. M. Manson ... ... ... .. | Do. ... ... | 132 | 452 |
| C. C. Dennis ... ... ... ... | White Wyandottes ... | 126 | 449 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 85 | 442 |
| *F. W. Leney ... ... ... ... | Do. ... ... | 122 | 403 |
| Totals ... ... ... ... | ... ... | 9,505 | 41,105 |

* Indicates that the pen is entered in the single hen test.

DETAILS OF SINGLE HEN TESTS.

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| LIGHT BREEDS. | | | | | | | |
| G. H. Turner ... ... ... | 98 | 109 | 137 | 125 | 107 | 129 | 705 |
| J. M. Manson ... ... ... | 113 | 100 | 94 | 101 | 105 | 123 | 642 |
| J. Zahl ... ... ... ... | 122 | 88 | 124 | 59 | 129 | 101 | 623 |
| J. R. Wilson ... ... ... | 116 | 101 | 96 | 109 | 93 | 97 | 612 |
| A. T. Coomber ... ... ... | 108 | 49 | 119 | 111 | 99 | 114 | 600 |
| A. W. Bailey ... ... ... | 36 | 91 | 115 | 114 | 111 | 112 | 579 |
| Mrs. J. R. D. Munro ... ... | 134 | 86 | 89 | 87 | 67 | 116 | 579 |
| Dixie Egg Plant ... ... ... | 94 | 108 | 108 | 112 | 109 | 10 | 541 |
| T. Fanning ... ... ... | 62 | 95 | 102 | 93 | 81 | 103 | 536 |
| A. E. Walters ... ... ... | 60 | 73 | 77 | 97 | 103 | 86 | 496 |
| C. C. Dennis ... ... ... | 94 | 82 | 25 | 92 | 94 | 100 | 487 |
| Dr. E. C. Jennings ... ... | 31 | 48 | 78 | 86 | 107 | 60 | 410 |
| HEAVY BREEDS. | | | | | | | |
| R. Burns ... ... ... ... | 96 | 98 | 132 | 110 | 147 | 171 | 744 |
| Mars Poultry Farm ... ... | 101 | 130 | 99 | 121 | 110 | 110 | 671 |
| E. F. Dennis ... ... ... | 110 | 99 | 115 | 125 | 125 | 36 | 610 |
| E. A. Smith ... ... ... | 84 | 77 | 62 | 121 | 91 | 80 | 515 |
| Oakland Poultry Farm ... ... | 122 | 70 | 67 | 63 | 119 | 63 | 504 |
| Kelvin Poultry Farm ... ... | 81 | 71 | 67 | 121 | 49 | 74 | 463 |
| Miss M. Hinze ... ... ... | 85 | 69 | 72 | 83 | 88 | 65 | 462 |
| F. W. Lency ... ... ... | 69 | 69 | 39 | 60 | 109 | 57 | 403 |

## TRUE TO TYPE.

The question of trueness to type has given us a good deal of thought and trouble. In all the breeds entered for the competition there is evidence of a very great deal of variation. Were this variation confined to differences between breeders, it could be understood, but it is found that the individual birds of a single breeder vary very considerably in type. Under these conditions, decision in this matter has been difficult, and those who have been declared ineligible are chiefly those whose birds show a decided lack of uniformity. Whether this is due to indiscriminate out-crossing caused by selecting birds from various sources without regard to their suitability to breed with the general flock, or whether it

is due to the infusion of the blood of other breeds with the object of gaining some fancied improvement in one direction or another, or whether the variation is due to a legitimate attempt to try different types to test their capabilities, it is hard to say. The point that stands out pre-eminent is that there is not even an approximate general conception of what the utility type of the various breeds should be, and this is certainly a matter of importance for the poultry clubs to take up; otherwise the breeds will lose identity. This year a very lenient view of the matter has been taken. Of those excluded, many have one or two good birds, but were spoilt by the inclusion of several birds of inferior quality. The following pens are ineligible for the true to type prizes:—

| | |
|---|---|
| H. Jobling, N.S.W. .. .. | Black Orpingtons |
| F. Clayton, N.S.W. .. .. | Rhode Island Reds |
| R. Burns .. .. .. | Black Orpingtons |
| T. B. Hawkins .. .. | White Leghorns |
| T. A. Pettigrove .. .. | White Leghorns |
| C. Knoblauch .. .. .. | White Leghorns |
| D. Fulton .. .. .. | White Leghorns |
| W. R. Crust .. .. .. | White Leghorns |
| T. Taylor .. .. .. | White Leghorns |
| C. C. Dennis .. .. .. | White Leghorns |
| J. Zahl .. .. .. | White Leghorns |
| W. Bailey .. .. .. | White Leghorns |

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH AUGUST TO 26TH SEPTEMBER, 1917.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Auntie's Lass ... | Ayrshire ... | 5 July, 1917 | 1,097 | 3·9 | 51·52 | |
| Lady Prim... ... | Holstein ... | 3 Aug. ,, | 1,056 | 3·7 | 45·79 | |
| Sweet Meadows ... | Jersey ... | 8 Aug. ,, | 543 | 6·2 | 39·89 | |
| Queen Kate ... | Ayrshire ... | 30 June ,, | 967 | 3·4 | 38·42 | |
| Confidence ... | ,, ... | 25 June ,, | 712 | 4·0 | 33·44 | |
| College Damsel ... | Holstein ... | 12 July ,, | 1,021 | 2·8 | 33·21 | |
| Lilia ... ... | Ayrshire ... | 11 June ,, | 881 | 2·8 | 28·64 | |
| Hedges Dutchmaid | Holstein ... | 9 Sept. ,, | 684 | 3·4 | 27·16 | |
| La Hurette Hope | Jersey ... | 22 Aug. ,, | 534 | 4·1 | 25·72 | |
| Miss Bell ... ... | ,, ... | 27 June ,, | 436 | 4·7 | 24·15 | |
| Lady Melba ... | Holstein ... | 14 Feb. ,, | 568 | 3·6 | 23·95 | |
| Nina ... ... | Shorthorn... | 6 Sept. ,, | 529 | 3·7 | 22·93 | |
| Netherton Belle ... | Ayrshire ... | 17 July ,, | 541 | 3·5 | 22·15 | |
| Princess Kate ... | ,, ... | 28 June ,, | 477 | 3·8 | 21·24 | |
| Hedges Madge ... | Holstein ... | 22 Mar. ,, | 425 | 4·2 | 20·97 | |
| College Bluebell ... | Jersey ... | 28 June ,, | 565 | 3·1 | 20·48 | |
| Lady Dorset ... | Ayrshire ... | 14 Aug. ,, | 555 | 3·1 | 20·05 | |

# The Orchard.

## CITRUS CULTURE.

(Paper read by ALBERT H. BENSON, Director of Fruit Culture, at the Fruitgrowers' Conference, held at Palmwoods, 6th October, 1917.)

In response to the request of your Committee to say a few words on the value of spraying, fertilising, and of experiment plots, I have thought it best to put the matter in writing in as brief and concise a form as possible, as, unless I do so, I may be tempted to go into details that will take up far too much of the time of this Conference, as each of these subjects is a very comprehensive one.

### SPRAYING.

The object of spraying is to distribute as evenly and economically as possible the various remedies that are used for the destruction of insect and fungus pests. In practice, this is best accomplished by distributing these materials in a liquid state by means of a powerful force-pump which will either force the spraying material into every crack and crevice of the trunk or main branches of the tree or will distribute it in the form of a mist-like spray that will reach every portion of the tree or plant that is to be treated. There are many excellent plants suitable for the work now on the market, from the knapsack sprayer, which is carried on the back of the operator, to powerful motor-driven pumps. The latter, where the orchard is large enough to warrant the expenditure, should always be used, as, owing to their power, they can distribute the spraying material much more rapidly, economically, and effectively than can be done by hand-power machines.

The efficacy of the spraying depends on three primary considerations:—

1. That the work be carried out in a thorough manner.
2. That the spraying be done at the right time.
3. That the right spraying materials are used.

With regard to the first, nozzles throwing a fine spray with considerable force should be used for spraying both the trunks and main branches—in fact, all the inside of the tree—so that the spraying material may be forced into every crevice, as well as the outside of the tree, so that every twig and leaf shall be reached. It is not necessary to drench the tree; it should be completely covered by the spraying material, but as little as possible should be allowed to run off. It is what sticks to the tree that does good—not what runs off.

With regard to the second essential, that of spraying at the right time, this is of the first importance, and it is a matter that deserves much more careful attention than it frequently gets. The best time to spray depends, of course, on the pest it is desired to destroy or prevent. Thus, the damage that is caused by all leaf-eating insects is reduced to a

minimum by spraying the plants or trees on which those insects are feeding with a material that will adhere to the foliage, and which, when eaten by these insects, will poison them. The best of all remedies for this particular class of insect is the spraying with arsenate of lead, used at a strength of from 3 to 4 lb. of the paste to 100 gallons of water, or 1½ to 2 lb. of the dry powder to the same quantity. In the case of all scale insects the best time to spray is when the young insects are hatching out, and this can be learnt by careful observation. When the young scales are first hatching out they are exceedingly easy to destroy, as they have no scale protection on their bodies; consequently, very weak sprays kill them immediately on coming in contact with them. When the insects have developed their scale covering, much more powerful sprays are needed. The sprays that are most useful for dealing with this particular class of insect are those that kill them by actually touching them, or those that kill them by covering them with a mixture which prevents their breathing. Of the former, the best remedies at present are the so-called residual oils, of which the red oils are a well-known type. These oils must not, however, be used excepting during a period that the tree is in active growth, as if the tree is dormant, and particularly if it is suffering from the effects of dry weather, there is a possibility of these oils being absorbed by the bark of the tree, which will have the effect of causing a quantity of the leaves to fall and possibly injure the smaller twigs. A strength of 1 in 40 of red oil will do more good when young scales are hatching out than a 1 in 20 solution when these scales are fully matured. The lime-sulphur wash is also an excellent remedy for scale insects. When used at its winter strength of 1 part of the standard solution (32° Beaume) to 8 to 10 parts of water, it will destroy fully matured scales, but the young scales are destroyed with comparatively weak solutions of 1 part of the standard solution to 30 to 35 parts of water. Washes in which resin and caustic soda form the principal ingredients are also valuable for destroying scale insects. These washes act in two ways—they actually destroy by touching the insects, and further, they form a glaze over the insects which prevents them breathing, and thus destroys them. These sprays, however, are not now anything like as commonly used as the red-oil sprays or the lime-sulphur. The latter remedy is also extremely valuable for the destruction of all types of spinning and other mites, such as the red spider, the Bryobia mite, and the well-known Maori mite, as the fumes of sulphur which are given off by this spray are extremely efficacious in destroying all these insects. In the case of Maori, these insects usually appear in large numbers about the end of December, and if they are dealt with at once by means of a weak lime-sulphur spray or by means of a soda-sulphur spray, the damage that they would cause were they left alone can be entirely prevented, and instead of having large numbers of blackened oranges, the crop will be clean and bright.

## SPRAYING FOR FUNGUS DISEASE.

Many sprays which are efficacious in the case of insects—such as arsenical poisons, oil washes, resin and soda sprays—are of little if any use for the treatment of fungus diseases, as they have not the power to

destroy the spores of the latter and are therefore useless for preventing either infection or for keeping the diseases in check once they have become established.

Fungus diseases, therefore, require special treatment and the use of sprays that are approved fungicides. Several materials possess fungicidal properties to a marked degree, such as sulphuric acid, sulphide of iron, carbolic acid, formalin, kerol, lysol, &c., and are used for special purposes, but are not as generally useful as copper salts, such as bluestone and carbolate of copper or of the various sulphides of lime, soda, or potash. Bluestone is used in conjunction with lime to form Bordeaux mixture, or with soda to form Burgundy mixture, and both of these mixtures form excellent sprays for such diseases as Irish Blight, Black Spot of grapes, Black Spot or Brand of the orange, Melanose, Canker, and removal of mosses or lichens from the trees, but are not, in my opinion, equal to the sulphide washes for such diseases as Dieback or Twig Blight, the so-called Exanthena, gumming, &c. The sulphide washes have also one great advantage over copper sprays, and that is they possess powerful insecticidal qualities where used as winter sprays at an increased strength or at a summer strength when young scales are hatching out. I am, therefore, very partial indeed to the use of these particular sprays, and I consider that, as an all-round spray, nothing has yet been discovered that equals the lime-sulphur wash, as it can be used in a concentrated form on the trunks and main branches of the trees during the winter, and also in the case of deciduous trees all over the tree after pruning, and such application is extremely effectual in the destruction of all scale insects and all classes of bark fungi, and undoubtedly has beneficial effects in preventing or checking gumming. Used at the summer strength it is, as I have already described, an excellent remedy for the destruction of young scales, mites of all kinds, and as a general fungicide.

Briefly, the systematic spraying of the trees during the winter with lime-sulphur and where scale insects are very numerous a subsequent spraying in spring with a weak solution of red oil will usually be found all that is necessary; but if any kind of mites or fungus diseases are very prevalent then a week lime-sulphur wash is preferable to the oil. In order to obtain the best results from spraying, the systematic pruning of the tree should be carried out in conjunction therewith, as, in the first place, proper pruning and thinning-out of the tree enables the spraying material used to be distributed to better advantage; and, secondly, the cutting away and burning of all diseased wood is one of the very best means that can be taken to keep down the various fungus diseases of citrus and other fruit trees.

## FERTILISING.

The object of fertilising land is to replace the plant-foods that have been removed from the soil by the growing of crops, as it is found in practice that the selling off the land of large quantities of fruit annually gradually results in the depletion of the plant-food in the soil, as such fruit, when sold, takes away in its ash considerable quantities, particularly of such substances as nitrogen, phosphoric acid, and potash,

which must be returned to the land in the form of a fertiliser if the inherent fertility of the soil is to be maintained. The bulk of our coastal soils, except those on which dense scrub was originally growing, or soils of an alluvial nature such as those adjoining the banks of creeks and rivers, are usually low in plant-food; consequently, sooner or later, they require fertilising in order to keep up their fertility and productive powers.

Generally speaking, all such lands are comparatively poor in available phosphoric acid, potash, or nitrogen. One of these ingredients only may be deficent, or it may so happen that there is a deficiency of all three. In the latter case, complete fertilisers must be applied—that is to say, fertilisers containing all these ingredients in an available form. On the other hand, when only one or two of these essential plant-foods are lacking, then this essential plant-food or foods must be made good. Of these plant-foods, nitrogen can be returned to the soil either in the form of green-crop manure or in the form of a commercial fertiliser, such as nitrate of soda, sulphate of ammonia, dried blood, or nitrate of lime, or in the form of organic manures, such as meatworks fertilisers, bonedust, &c., where it is combined with phosphoric acid. Phosphoric acid can be returned to the soil in the form of bonedust, meatworks manures, Thomas' phosphate, superphosphate, or ground phosphatic rocks. In the case of superphosphates, the phosphoric acid is readily available; in other words, it is soluble in water and can be taken up by the plant at once. In the case of bonedust, finely ground meatworks manures, and Thomas' phosphate, the phosphoric acid is in a less soluble form but still readily available, but in the case of rock phosphates it is only very slowly available. Potash can be returned to the soil in the form of potassic salts, such as sulphate or chloride, which are obtained from big deposits that are met with in Germany. Just at present, owing to the war, this source of supply is cut off, consequently potash salts are extremely hard to obtain. Large quantities of potash are, however, annually lost in Queensland in the excrements of our domestic animals, which are frequently, in fact usually, allowed to be wasted. Were these conserved, as is done in the older countries, we should not now be feeling the deficiency of potash which is apparent in many of our poorer soils to-days. Lime is not, properly speaking, a manure, except in soils that are absolutely deficient in this material, but on account of its valuable properties, such as the rendering of any plant-food present in the soil more readily available, its sweetening sour soils, its encouragement of bacterial action in the soil, and its ameliorating effects on heavy soils and its consolidating effects on light soils, it is frequently looked upon as a fertiliser, and for all fruit districts in Queensland it is undoubtedly essential. Lime can be applied to soils either in the form of freshly burnt limestone, air-slacked burnt lime, or ground unburnt limestone. In the first form it is extremely valuable for neutralising the acidity in the soil and has also a powerful action in breaking down stiff, clayey soils; but its action is somewhat too severe in the case of naturally sweet soils and those in a perfect mechanical condition, as it is apt to injure the organic conditions of

the soil and to retard for a time nitrification. Air-slacked lime can be applied practically to all soils, as during the process of slacking the lime is converted into a fine powder which can be spread easily and evenly over the ground.

The difference between caustic or freshly burnt lime and air-slacked lime is that the former when slacked takes up from the air a quantity of carbonic acid gas, so that 56 lb. of freshly burnt pure lime will weigh 100 lb. when slacked. The slacked lime is in the form of a hydrate of lime combined with a certain amount of carbonate of lime and the hydrate rapidly becomes converted into carbonate. Ground limestone is a carbonate of lime. In other words, finely ground limestone is practically the same substance as caustic lime once it has become thoroughly air-slacked and has become reconverted into the carbonate. With regard to the value of the different forms of lime, roughly speaking, 1 ton of freshly burnt limestone is equivalent to 2 tons of air-slacked lime or 2 tons of finely ground limestone, so that the purchaser can easily determine which is the cheapest form in which to purchase lime. Air-slacked limes or finely ground limestone are not as quickly acting in the case of heavy soils as freshly burnt lime, but they are more generally beneficial in their action in that they promote nitrification, improve the mechanical condition of the land, and also tend to correct any acidity that may be present therein. Caustic lime must never be applied in conjunction with other manures, particulary those containing nitrogen either in the organic or most inorganic forms, as it tends to free the nitrogen and cause serious loss. Finely ground limestone, on the other hand, can be used with any other manures without any danger whatever. With regard to manuring generally, quick-growing crops such as vegetables require the fertilisers used to be in a readily available form, so that the plants can get them right away, but in the case of fruit trees it is always advisable to use a certain proportion of the fertilising material in a less available form, as thereby the action of the manure is spread over a longer period and the trees are not overfed at one time and underfed at another. It is not necessary for me to enter fully into the details of manuring at this Conference, as full particulars respecting this subject can be obtained from the pamphlet issued by the Chemist of the Department of Agriculture and Stock, which goes very fully into the whole question.

## EXPERIMENT PLOTS.

I am very strongly in favour of the establishment of farmers and fruitgrowers' experiment plots by the Department, as I consider that such plots are a practical means of bringing home to the farmers or fruitgrowers of any particular district the value of particular methods of culture, pruning, fertilising, the treatment of disease, or any other points on which growers require special information. Such experiments do not need to be extensive and need not cost the country a very great deal of money. At the same time, careful records must be kept and, whether the experiments are successful or otherwise, full and definite details of same should be published and be available for the information

of all growers. There are many matters that are constantly exercising the attention of growers that can be dealt with collectively rather than individually; in other words, a series of experiments carried out at one centre in a district will prove of value not only to every farmer or fruitgrower in that district but also will be of more or less value to fruitgrowers in other districts. Already certain experiments have been carried out by this Department in years past, such as the manurial experiments that were carried out by the Agricultural Chemist and the writer in connection with the growing of pineapples and bananas—experiments which definitely fixed the important question of manuring these crops. Many experiments were also carried out in the treatment of various fruit pests both with respect to spraying and cyaniding, and I am of the opinion that there is still ample scope for numerous experiments to be carried out in the different fruitgrowing districts throughout the State, as we have still many matters on which we require very much fuller and better information than we possess at present. For instance, owing to the very great increase in the planting of bananas in Southern Queensland during the past six or eight years, there has been a tendency to plant this fruit on any class of land and to set out plants irrespective of their freedom from disease or suitability for such land. The result has been that the flask-worm or nematode, that was first described by Dr. Bancroft some thirty-eight years ago, has been spread throughout most of the banana-growing districts of the State, and I am sorry to say it is doing a considerable amount of damage. This particular pest is an extremely difficult one to combat, and, so far as is known, no treatment other than the rotation of crops has been found efficacious in any part of the world. The matter, therefore, is of such importance that experiments are to be conducted, both in the Southern and in the Northern parts of the State, in order to determine whether any remedial methods can be found that will in any way tend to lessen the damage caused by these insects. The question of the systematic pruning of fruit trees is also a matter that requires careful experimental work. And, in addition to these two instances, there are many matters which can be dealt with experimentally with probable benefit to our producers.

From these remarks you will therefore know that I fully appreciate the value of experiment plots, and as far as means permit I shall encourage such experiments.

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## CITRUS CULTURE.

(Paper read by S. C. Voller, Assistant Instructor in Fruit Culture, at the Fruitgrowers' Conference, held at Palmwoods, 6th October, 1917.)

As this Conference sits only for one day, and there must naturally be many matters of interest and importance to deal with, I purpose making my address as concise and direct as possible.

I am appearing on this occasion in response to a long-standing request from the Palmwoods growers for a lecture on "Citrus Culture." This was desired because there are a good few who have started in this line during recent times, and, having young orchards coming along, they wish for what light I can give them on the subject. This being right in the line of my official duty, I have much pleasure in acting.

## QUEENSLAND'S CAPABILITIES.

There can be no doubt in the mind of any well-informed person as to the capabilities of our State for citrus production. During the years that have passed since the first of our early pioneers planted seeds or trees, the rapidly expanding area of cultivated land on the whole length, almost, of the Eastern coast has given, and is still giving, ample proof of what can be done, while further inland our Western country stands waiting for the call, should it ever come, and is ready to respond. And what a response is possible! We may well be pleased, even proud, of what has been done in some directions on the coast; we are justified in expecting greater things here by far than we have yet reached; but, in my opinion, in the West will some day be seen the real answer to the question as to what we can do in citrus production. When the day of really large requirements comes, much as we know we can do on the coastal areas, the West can beat us in both quantity and quality. The areas of land are there, the quality of soil, and the climate backed up by good bore water, capable of turning out unlimited quantities of fruit as good as anything on earth. That is my opinion of Queensland, and we have had in support of it proof put forward by more than one place. The Roma district and the country at Barcaldine may be mentioned in this connection.

The finest Navel oranges I ever saw anywhere came from the West. The best lemons I ever saw in Queensland were at Barcaldine. One could go on in this strain to further length, but it is not necessary.

## SOILS.

We have, fortunately, a pretty wide range of soils that will grow citrus fruits successfully. As you all know, the coastal soils vary considerably. We have all sorts between the deep, rich, red soils of such districts as the Blackall Range and practically pure sand in other places. Colour does not matter. The things that do matter are quality, texture, depth, natural drainage, and a level lay-out of land surface if you can possibly get it. Granted the right texture and good depth you will have good drainage within a reasonable limit. You may have good quality and texture without depth, and in that case you must either drain artificially or plant somewhere else if you do not want to fail. Quality is desired because poor land requires all the more feeding; free texture, or freedom from sticky, binding character, is absolutely necessary to allow of good, deep, free rootage below and good growth above; drainage you must have or your trees will never succeed as they should.

We have lots of good land in many directions, but it will answer all practical purposes in connection with this address if I tell you that,

according to my judgment, right here in Palmwoods you have that which it will be hard to beat anywhere. This is said, of course, without prejudice in any way against any other part of the State.

## DRAINAGE.

A word or two on drainage. Many people think that land is well drained because it has a good slope. This is all right from the point of view of one who wishes to get rid of surface water, but in the case of the agriculturist the idea is utterly wrong. No orchardist has any use for the rainfall that only rushes over the surface of his land and goes right away. The moisture is needed, of course, in the soil, and the drainage capacity desired in that soil is such that the rainfall can go in and down through the whole body of it and find an easy exit below for whatever surplus there may be. In these conditions the soil naturally retains what it needs; and it can hold, even in very free compositions, just what it needs, generally speaking.

A slope with the right texture and depth of soil will generally be found safe as to drainage. A slope, especially a long one, that holds beneath the surface any obstruction such as clay or rock, both of which frequently occur in bars or layers, is useless because the excess of moisture works down hill and is thrown out in wet or boggy patches by the obstruction mentioned. You cannot succeed with citrus fruits in shallow or badly drained soil: bad drainage means stagnation, and stagnation means poison, and you can guess the result. I am particularly emphatic on this drainage question because I have had some extensive and valuable experience in connection with it. At my own home, over forty years ago, underground drains were put in, in part of our orchard, to counteract the effect of a defective subsoil. This was an almost impervious granitic formation, the soil itself being also granitic. Before this, young trees absolutely refused to grow. They could not do it, but stood there in actual misery. When the drains were put in, a sudden remarkable change took place. There was a positive transformation, and those trees never looked back. I can say for your information that those drains hold good to-day.

In another instance I planned and superintended a complete drainage scheme for another property, involving considerable outlay in both labour and material. Here it was a case of fighting the enormous soakage underground from surrounding granite ranges, which, being porous, absorbed most of the rainfall, only to throw it up again in the lower country in the shape of springs and bogs. You can guess what drainage means to an orchard when I tell you that in this case the outlet-pipe of the system was 12 in. in diameter inside, and I have known that pipe run full for a fortnight. It was not a case of shallow or inferior soil here by any means, but an unusual intake in soakage. The result here has remained permanently good, as it is pretty near thirty years since I did that job.

## PREPARATION OF LAND.

Wherever it is possible to do it the land should be well prepared before planting the trees. Deep and thorough working, as well down

into the subsoil as you can go, will be well repaid. We need deep rootage, and the only way to secure that is to make it possible for the roots to go down. In some soils they can and do do this with very little aid from deep working. In other soils—such as some of our rich, greasy scrubs—the chances are against good deep rooting. This is mainly due to the fact that the stumps and roots absolutely prevent the breaking up of the land, so that trees are planted without this; and also that later on, after the roots and vegetable matter in the soil have disappeared, the land, under the marked changes of weather, sets so close as to be almost impenetrable. On all our scrub lands where trees have been planted it will pay the grower well to start in with deep and thorough cultivation both ways as soon as the stumps can be got rid of—that is, of course, supposing the land is level enough. This will very largely make up for the lack of preparatory work before planting.

## PLANTING.

Granted the right class of soil properly prepared, I would advise planting from 25 to 30 ft. apart on the square. The closer distance for lemons, limes, and mandarins, and the greater for oranges, including Sevilles. If the soil is of the right sort, and properly worked up, it will not be necessary to open a huge grave in which to plant the tree. A couple of feet square opened out according to the rootage of your trees, and well broken in the bottom with the bar, will be quite good enough. The roots of young trees should be carefully studied and trimmed as may be needed. You may safely trim off all small fibrous stuff at the top if such there should be, and use the stronger and main roots, placing them as carefully as you can to ensure their getting a good start down into the soil. You do not want a growth of young roots on the top of the ground. I have always been against this. We want the roots to grow and work outward below our well-cultivated surface. They can be made to do this. In some classes of poorer soils manure may be added at planting time, when it should be judiciously mixed with the soil as it is filled in. Richer soils will not need this, perhaps, till later on when the trees begin to bear.

The question of depth of planting must not be overlooked. On slopes where the soil is pretty certain to be lost to some extent by washing, I would say: Plant as deeply as you dare, leaving the upper part of the holes not quite filled, like a saucer. Keep the surface like this if you can for the first few seasons. On good level land, with no danger of washing, I advise the exercise of common sense and moderation. You can plant trees so high out of the ground that you spoil them; on the other hand, I have seen many young trees so deeply planted that they could not grow, and they did not grow.

In marking out for planting, use a No. 12 wire long enough to do half, or a good part, if not the whole of the row. Measure the distances for your rows along the headlands, put in strong pegs there, have a ring at each end of your wire, and a dab of solder on the wire every 27 or 30 ft., or whatever distance you intend planting; draw the wire

tight and drop the ring over the pegs at the ends, and you cannot go wrong in placing your trees. Each dot of solder means a tree, and you cannot make a mistake, and you lose no time dodging about. After planting, follow up reasonable light cultivation to kill weeds and conserve moisture.

## PRUNING.

The work of pruning is a matter of the greatest importance, and it begins with the early youth of the tree. Properly trained nursery stock will not require much treatment, and, unless the young trees have long or irregular tops, it is not a good thing to cut them about when planting out. Begin your cutting when the shoots come and you will avoid a partial dying back of the top which frequently occurs on trees cut back at planting. When the growth starts make up your mind that you are going to control the trees properly. The first thing of all in pruning is to understand your tree, the next that you are master of that tree, and then things fall into line as you exercise that mastery. The young tree should be trained with a foundation of three or four good, sound limbs as evenly placed as possible, and to get them it is sometimes advisable to cut the head clean off the young tree. Trunks should be established about knee high. Do not start your first main limbs too close together, as in later years the tree may split if bearing heavy crops. As growth goes on and the tree increases in size, it will be found that the heads of the original limbs develop until they may in turn be divided into sections, each having its own head or top and outer growth to be considered and arranged for.

This will include the opening out and freeing from small and useless growth inside of the tree on the main limbs and their continuations further up. Avoid the multiplicity of prongs in the forks like hayforks, or the development of "gridirons" amongst the branches. We often see plenty of this amongst the orchards. The bulk of our orchards are badly neglected in the matter of pruning, and it cannot be too well remembered by all our growers that the objects of pruning are to conserve power, to avoid waste, to direct the energy of the tree properly, and to produce a fair and profitable crop of good-quality fruit, instead of an enormous amount of small, inferior, and useless stuff. It does not pay any orchardist to grow small or poor fruit. It does pay to grow really good stuff and keep on growing it, and one of the greatest helps to this is systematic pruning. I would earnestly urge, as we have done for years, all our growers to pay more attention to this matter. Over and over again people have said that I was too severe in my pruning work, but I know what it works out to, and my advice to-day is: Don't be afraid to cut once you know what you are at. Especially is it necessary to prune unmercifully in connection with some of the diseases we have amongst the trees. Speaking in a general way of pruning, it may be said that the man who understands his trees will always work, and very often almost unconsciously, with the model of what the tree ought to be carried in his mind. Then, as the work goes on and tree after tree is dealt with, you will find the "scheme" of the work showing out very effectively.

It may also be said that good pruning conduces to good health because it avoids the crowding up of a lot of scrubby wood and, at the same time, the breeding up of a lot of troubles that are encouraged in the unpruned tree. Further than this, there is the outstanding enormous benefit gained in connection with spraying. No man on earth can make a decent job of spraying in a lot of the badly grown trees we meet with. It cannot be done, and therefore the owner of such trees is always at the mercy of his enemies and never has much chance of getting clean fruit. You can spray with half the stuff, half the trouble, in half the time, and make ten times the good job of it in the case of trees that have been well pruned. I am not in favour of pruning extensively while the trees are in bloom, or when there is a burst of young growth on, but beyond that I would not hesitate to prune at any time. Probably the best time of all is when the crop has been gathered early enough to have the trees still dormant.

Reference may also be made here to root pruning. We know the value of root pruning in regard to other things besides citrus trees. Grape vines especially call for careful attention in this respect, and pay for it when they get it. Practically, all fruit trees are the better for some control being exercised over their root growth. I have already stated that I do not want the roots of my young trees on the top of the ground. For forty years or more I have followed a style of cultivation that did not allow of purely surface roots running over my orchard. My advice is to deal thoroughly with these in all cases where the lay of the land allows good cultivation. On steep slopes, especially with variations of soil, you have a different problem, and a queer one at that. To my mind, the reason why roots of citrus and many other trees come to the surface is to breathe, to drink, and to feed. In uncultivated places you find the roots right on the surface. In well-cultivated land there is no need for them to come right to the surface, and they won't do it, because moisture, food, and air are all sent down to them; and then, in addition, they get the advantage of a good natural soil mulch. In regard to the roots the same may be said as was said of pruning the trees—that you are the master, and you must study your tree and all its surrounding conditions and control it accordingly. It appears to me that in view of the attack of root borers in citrus trees, as has been discovered in recent times in certain parts, we shall very likely find ourselves up against a very peculiar problem in root pruning. A word or two may be said here of the interesting work done in the North Coast districts recently, and still being carried on, by Mr. Scerri. Many of our growers know of his pruning both above and below ground. Probably the most pronounced of his work is done in root pruning, and it will be a matter of interest to all growers to note the results of this. In our opinion time will be necessary in this direction.

## CULTIVATION.

Your orchard can never rise to its best without good cultivation. Many orchards are planted where such work is an impossibility, and sooner or later, in one way or another, they must inevitably suffer. Good cultivation should begin before the trees are planted, and this

initial part should consist of deep working and thorough preparation of the soil so that your young trees will make themselves at home from the start. I cannot, in this paper, go into too many details; but it may be said that, with a pretty wide choice of implements, it is not a matter of serious difficulty for a man to begin with good work and keep it up afterwards. Good ploughing—and this to a decent depth, too—in the winter, light ploughing and other styles of work through the summer, and careful attention by hand labour under the trees themselves is what is needed. Sometimes a summer ploughing will do the world of good in turning in a fine growth of weeds or a mixture of weeds and crop. It does not appear to me as necessary for a man to be always tearing his orchard soil about with some kind of tool or implement. Sometimes you can do harm by an inopportune tearing up by interfering with some of Nature's wonderful processes of dealing with a lot of stuff that had, perhaps, been recently turned in with the plough.

Sometimes a man will do better by using a set of harrows only, instead of a plough, when the question of the conservation of moisture is an urgent one. Sometimes, especially in drier areas, one can plough on a sudden chance fall of rain such as may occur with a storm, and do a lot of good too. Sometimes you will do most good by leaving your soil and your trees in peace for a while. But do not turn this into an excuse for neglect. Neglect is the basis of pretty well all trouble in orchard work, as it simply opens the door for all our enemies to march right in. In regard to the question of cultivation on steep slopes, all we can say is that a man must use his judgment and be guided by circumstances. All soils are not the same; some, even on slopes, wash away more easily than others, while some may be retained and worked with far greater success than others. There can be no doubt that there is and always will be a difficulty here, because, sooner or later, if you persist in trying to cultivate properly you will be caught and will lose your soil; while, on the other hand, if you do not cultivate you get trouble in other directions. The relationship between good deep cultivation and good deep rootage must never be lost sight of. Without the right method of soil-working you cannot properly control your roots. Finally, good cultivation means that your trees can get the best out of your land; and that is what should be aimed at.

## WHAT TO PLANT.

A word of advice may well be given on this matter. New growers will do well to avoid going in for too many sorts. If you are going to grow for commercial purposes, then go for one or two good lines in fair quantity so that you can meet good orders for what consumers want. Do not go in for fancy work. Such sorts as Valentia Late, Dunning's Navel, Jaffa, Mediterranean Sweet, Sabina, and Siletta will give plenty to pick from in oranges, and I would only choose about three at the outside. In mandarins a couple of good ones is plenty. As to lemons, care will be needed mainly because, on the coast, our lemons are so scabby. Apart from that, if a lemon is grown on the coarse side,

it will do for candied peel, and for good shop stuff for drinks the market is pretty safe. Sevilles, in my opinion, will yet come in to their own in Queensland, and when they do their value to the grower will be discovered in no uncertain way. I put this down as one of the most profitable of the citrus family, granted a fair market value, and taking many points in connection with production into consideration. I would advise the planting of good, sound worked trees only, of all kinds. The grower has much to gain and little, if anything, to lose by this.

## DISEASES AND PESTS.

The name of these is legion, and on this occasion I can only deal briefly with this section of my subject. They may best be described under Mr. Benson's old classification of a good many years ago as follows:—

### Insect Pests.

1. *Insects that Live by Suction.*—In this class all scale insects, aphides, mites, and sucking-bugs, are included. Most of you are well acquainted with the general list of these enemies, and I need not do more now than refer you for further detailed information to the pamphlets issued by the Department of Agriculture and Stock. The same remark will also apply in the matter of remedies. These are all set out in proper order, and I would only say here that to the old list must be added such spraying compounds as the oil sprays now on the market.

2. *Insects that Destroy Foliage, Skin of the Fruit, &c.*—This class includes all those insects that actually devour their food, other than those to be presently dealt with, as distinct from those already mentioned which live by suction. For the whole of these there is one great remedy —viz., to poison their food. In my own opinion two things stand out above all else that I know of for this purpose. These are arsenate of lead and Bordeaux mixture. With the latter I have had some splendid results against caterpillars, grasshoppers, and particularly against the corn moth in citrus crops. Both these mixtures deserve attention from our growers, and of Bordeaux mixture it may be said that while it is acting as a poison it is invaluable as a fungicide amongst citrus.

3. *Insects Boring into the Fruit.*—Our old friend the fruitfly comes in here, followed by such as the peach moth and corn moth.

4. *Insects Boring into the Tree.*—Here are included the larvae of several species of beetles which do serious damage to citrus trees by boring into either the trunks, limbs, or roots. Briefly, I may say that against this class of pest we put good, careful pruning, because before an attack you can see all through your trees and also spray all through them easily, and the beetles may be thus caught at the start; also, after an attack you can more easily detect it, and follow up the enemy at once with little or no difficulty. Further than that, well-pruned trees do not offer the same attraction to any pests that scrubby ones do. Next, destroy all elephant and longicorn bettles that may be seen on the trees at any time. They may be destroyed by catching them, or they may be poisoned by sprays, as they feed on the young bark and leaves. The root borer, at present causing some anxiety in some parts, is, in my

opinion, deserving of the most careful attention, as can be seen at a glance at samples of his work which I have here for your notice.

### Fungus Pests.

To quote Mr. Benson's pamphlet: "Parasitical fungi of many kinds attack all portions of citrus trees—the fruit, leaves, branches, trunks, and roots all being more or less subject to their ravages. The humid climate of our Eastern seaboard is conducive to this development, whereas they are conspicuous by their absence in the warmer and drier parts. If neglected, they cause considerable damage; but, fortunately, we have remedies the application of which reduces the loss to such an extent that they are not any serious menace to the industry."

These are Mr. Benson's words, and I would like to call your special attention to them where he says: "We have remedies the application of which reduces the loss," &c. I agree with this, but at the same time I want to say this now, that if these remedies are not applied, the citrus-growers have fungus troubles silently, slowly, but surely developing and spreading that will give all the trouble and loss you will ever need without the aid of any other enemies.

1. *Fungi Attacking the Fruit.*—These are with us; mainly Melanose, Black Brand or Black Spot, Brown Spot (found here on both mandarins and oranges, though mentioned by some authorities as Brown Spot of the Mandarin), and Blue Mould. The treatment for all these may be put in a nutshell, thus: Merciless pruning, according to circumstances; the prompt burning of all prunings; and periodical spraying with Bordeaux mixture or lime-sulphur mixture. Generally speaking, we prefer the latter because it kills more enemies of other kinds at the same time than the Bordeaux mixture does. Both are first-class sprays for the particular line of treatment, and where trouble is at all severe they should be repeated two or three times in the year.

2. *Fungi Attacking Trunk and Branches.*—There are quite a number of these more or less troublesome, some being deadly in their attack. They are seen appearing in various colours and forms. In colour they range from deep black, just like blotches of ink, to almost white. In form they are at times like rusty blotches, sometimes leathery; again at times of a cankerous appearance; and they may also be found like streamers or strands of cobweb running along the branches and down the main wood or trunk. The same remedies apply here and are promptly effective.

3. *Fungi Attacking the Roots.*—More than one of these may be found in citrus orchards, and generally in land such as scrub or semi-scrub having plenty of stumps and roots in the soil for some time after planting. Where any attack is found, cut out affected roots, working back on to clean bark and wood; dose the soil with lime in which is mixed a handful or two of coarse salt. Don't put this down in lumps or heaps, but sow it on and mix with the soil by working in. Another fine cure for root fungus is salt water. Dissolve a double handful or so of coarse salt in a kerosene tin of water and distribute this evenly over

the surface and let it soak in. The quantity to be used depends on the size of the tree. In addition to fungus pests there are certain mosses and lichens which grow on our trees, and these may be mentioned as coming under the same treatment in spraying.

### Useful Fungi.

It may not be generally known to citrus-growers that amongst our best friends are two or three small fungi that attack scale insects and clear them off the tree frequently. The most remarkable instance I have ever seen of this action was at Redlynch, in the Cairns district, where growers were almost relieved of the necessity for spraying by reason of the wholesale attack on scale by these fungi. These friends are in colour red (like little dots of red coral), sometimes grey, and again, in other cases, blackish.

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## NEW DISEASE OF THE PINEAPPLE REPORTED.

Mr. D. B. Mackie, Entomologist to the Bureau of Agriculture, Manila, writes in the "Philippine Agricultural Review," vol. X., No. 2, 1917:—

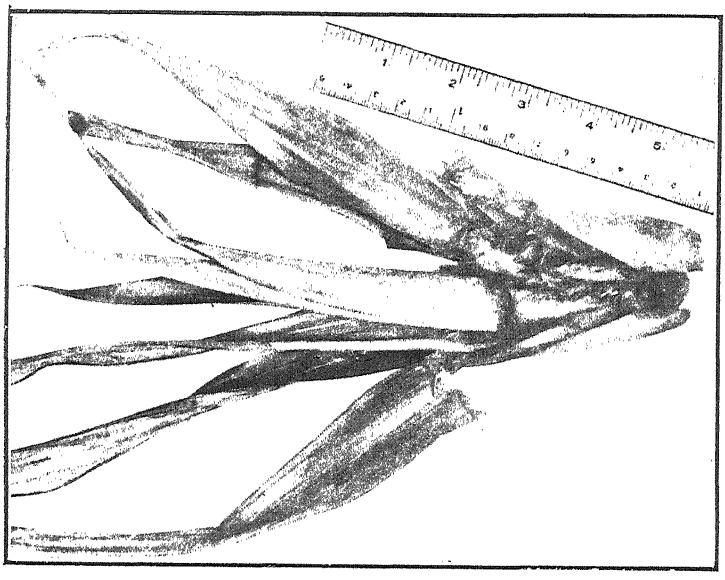
"The attention of the Bureau of Agriculture has been called to the presence of a disease affecting pineapples in the Archipelago which, if allowed to spread and become distributed, may prove a serious menace to this crop. The disease has been noted on the varieties known as Smooth Cayenne and Queen. It causes a hypertrophy of the tissues which gives them a rough corrugated appearance. It has also been noticed that the suckers prepared for shipping which show these same corrugations often develop a heart-rot, which causes the entire heart to become shiny and easily pulled out. Whether this rot is characteristic of the disease is not yet known, but it has been noticed on about 10 per cent. of the suckers which also showed the corrugation.

"In Hawaii there is a disease of pineapples which the Territory has subjected to a local quarantine. A rule of the territorial regulations states that all persons and corporations are prohibited from carrying, transporting, or shipping from the islands of Kauai or Oahu any pineapple, fruit, plant, or sucker, and none of them shall be allowed to land at any port in the Territory. For a violation of this regulation a fine not to exceed 500 dollars (£100) is imposed.

"Correspondence with the Hawaiian authorities leads this Bureau to believe that the disease which has been reported from Binan, Laguna, and from Pinelands, Nueva Ecija, is the same which has proved so troublesome in the Hawaiian Islands.

"As little seems to be known of the disease, affected plants should be pulled out and burned; also particular care should be exercised to see that no infected suckers are used for propagation or for distribution. While the pineapple can hardly be termed a commercial crop in the Philippines, one company cultivates it on an extensive scale, and has proved that its culture is a commercial possibility."

The plate gives an idea of the appearance of the diseased stock.



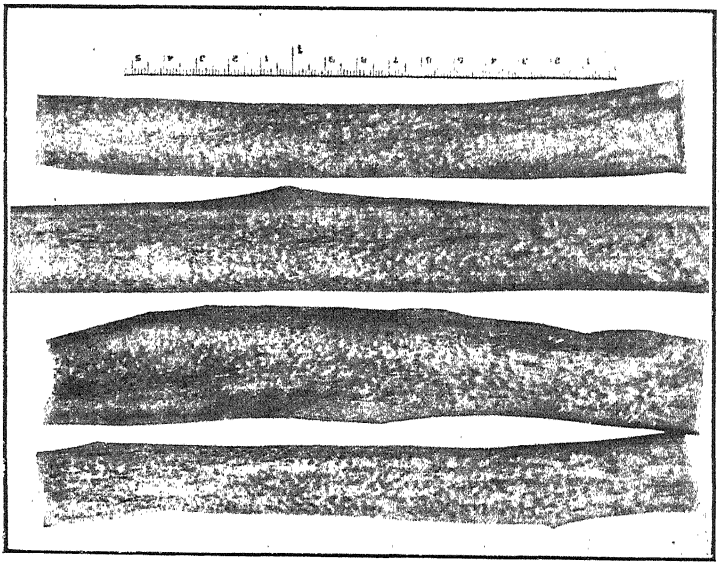


PLATE 33.

(A) Diseased Leaves of Pineapple, showing corrugations. (B) Diseased Pineapple Sucker, showing heart rot.

# Botany.

## RECORDS OF A FEW ALIEN PLANTS.

By C. T. WHITE, Acting Government Botanist.

At the October meeting of the Queensland Royal Society, Mr. C. T. White, Acting Government Botanist, read the following notes accompanying an exhibit of plants met with as strays from cultivation, &c.:—

"Of late several plants have been brought in or sent in for identification as having been met with as naturalised or strays from cultivation; in some cases the specimens have been brought in under the impression they were natives. It seems desirable to put some of these on record, as, apart from the purely botanical interest, the matter is of some importance, for a species that to-day may be represented by only two or three stray plants may to-morrow be a naturalised weed of considerable aggressiveness. Only the other day at the back of some Brisbane wharves I saw one or two plants of *Inula graveolens*—the stinkwort. This had not been seen before, so far as I know, in Queensland, but in the Southern States several thousands are spent almost yearly on its eradication.

### ORDER LEGUMINOSÆ.

### *MEDICAGO MINIMA*, Linn.

Lesser Medick Burr. Specimens were handed over to me by Mr. E. W. Bick, who stated that it was coming up here and there in the Brisbane Botanic Gardens. The plant is similar in growth to the common Medick burr (*M. denticulata*), but the pods (burrs) are smaller and the whole plant covered with silky hairs.

### *CASSIA TORA*, Linn.

An annual glabrous undershrub. Leaves petiolate, 4-8 foliolate with a gland between or above the lowest pair of leaflets. Flowers few, in very short axillary racemes. Stamens 10; the anthers of the upper 3 imperfect. Pod linear, slender, curved, 4-6 in. long, 1½-2 lines broad.

A cosmopolitan tropical plant. Mr. H. G. Ladbrook, Johnstone River, writes (19/7/17)—"Was introduced as a green manure, and now grows on roadsides, emitting from leaves, &c., an offensive smell." Some naturalised species of Cassia are amongst our most prevalent weeds.

### ORDER ASCLEPIADEÆ.

### *CRYPTOSTEGIA GRANDIFLORA*, R. Br.

Madagascar rubber. This well-known garden plant has firmly established itself as a weed in certain parts of Northern Queensland. In forwarding specimens for identification, Mr. A. C. Stevens, acting land commissioner, Rockhampton, wrote (25/9/17)—"I beg to report that yesterday, at the request of Mr. Mackellar, I visited the Rifle Range at

North Rockhampton to see the growth of a vine-like bush or plant known as 'Madagascar Rubber.' The plant has a strong tap-root and is hard to pull up, but could probably be eradicated by grubbing. It is now fairly thick on parts of the Rifle Range, and if not destroyed the whole reserve will become infested in a short time. I understand that this plant has only recently made it appearance on this reserve, though it has been growing in other parts of the town for some years. I have noticed that when growing among timber it grows like a vine to a considerable length, supported by the tops of trees." It is very abundant about Townsville, and is also very common on the Gilbert River.

ORDER BIGNONIACEÆ.

*TECOMA CAPENSIS*, Lindl.

This well-known South African plant, so common in Queensland gardens, is found here and there in the scrubs about Brisbane. It is to be found growing along Ithaca and Enoggera Creeks, and specimens have been brought in to me by Mr. W. Macmillan from the head waters of the latter. In the open it is of shrubby growth, but, when growing in the scrub, climbs up the trees to a considerable extent.

ORDER SOLANACEÆ.

*SOLANUM SEAFORTHIANUM*, Andr.

When collecting along Woogaroo Creek recently with my friend, Mr. H. A. Longman, we found several plants of this climbing Solanum growing in the heart of the scrub, the seed evidently having been carried by birds. It is very common in gardens, and is to be often seen about deserted homesteads.

ORDER LABIATEÆ.

*MENTHA VIRIDIS*, Linn.

Spearmint or common garden mint. Found growing as a stray along several of the creeks at Tambourine Mountain, Southern Queensland (*Longman* and *White*, February, 1917)."

## CHANGING THE COLOUR OF HYDRANGEAS.

There are several methods of turning hydrangeas from their ordinary pink colour to blue, but they all require time. Here is one method which should not fail to effect the object in view. The plants must be prepared a year in advance of flowering, and all traces of the old soil, in which they have grown, removed. Pot the plants in peat, adding two-fifths leaf mould and one-fifth sand, 10 per cent. of powdered slates, 3 per cent. sulphate of iron—or a larger quantity of iron alum—and 10 per cent. of ammonium sulphate. Lime should not be used, and it is necessary to employ rainwater for the roots. Water the plants during the growing period with water containing ¼ oz. of sulphate of iron to the gallon.—"Farmers' Advocate," Durban.

# Viticulture.

## THE MILITARY IMPORTANCE OF WINE.

Several articles on Viticulture and the wine industry in Australia have been published in this Journal during the year. The writer of these articles, Mr. G. A. Gattino, struck a good note in his paper (May, 1917) entitled "Viticulture and the Wine Industry after the War," in which he wrote—"Wine is to-day a real necessity to all fighters. Wine raises the morale of the fighters, dissipates their sad thoughts, and comforts the soul. Wine is necessary to recoup their enormous loss of energy, when the nervous system is under such tension that it can only be imagined by those in the firing line."

The following article on the military importance of wine appeared lately in a South Australian publication (October, 1917), "Garden and Field," which bears out Mr. Gattino's contention, that wine (not spirits) is a necessity for soldiers:—

"It is perhaps safe to say that scarcely at any period in the past has a vintage been awaited with greater anxiety on all sides by the populations of the principal winegrowing countries of Europe, both from the commercial point of view, on account of the failure of last year's vintage, and from the military standpoint, by reason of the imperative necessity for a bountiful supply of natural red wine for the fighting forces of our allies.

"In proof of this it may be stated that France has already requisitioned for her military needs the astonishing total of some 200,000,000 gallons of this year's wine (representing one-fifth of her own entire annual production) as well as more than 40,000,000 gallons from her Algerian colony, and storage has already been arranged for this enormous volume of wine, representing in value no less than £20,000,000 sterling, by the taking over of special warehouse accommodation in every department of France.

"So essential is the regular supply of pure wine considered for the well-being of the troops that similar exceptional precautions are being taken to safeguard the crop in Italy, not only for her soldiers at the front but also for their sick and wounded comrades in the hospitals. That these early steps in protection of this year's produce of wine for military uses in the respective countries should be deemed necessary is the more remarkable in face of the fact that this vintage, though not abnormally abundant, has proved to be a full average one at least in all the more southern countries of Europe; and, further, that while France will have for her own consumption the large quantity of her wines that formerly went to Germany, Italy will likewise retain within her own borders that large proportion of her vinous products which in pre-war times found a ready outlet in Germany, and to a much smaller extent in Austria-Hungary."

# Apiculture.

## PRODUCING SALEABLE HONEY.

By ARTHUR C. MILLER.

It is easy enough to "keep bees," but to make them pay is a different matter. About the first bit of instruction given to the novice is to get his colonies strong as early as possible, and as most of the instructions have been written by beekeepers in the regions where clover affords the main yield, the instructions have all centered on securing that crop. But there are vast regions where clover is not the main crop and other regions where it does not grow, and where to work to get the colonies strong, early, is labour wasted. To meet with the greatest success the colonies should be strongest when the most desirable flow comes, be it early or late. Langstroth used to say: "Keep your colonies strong," and taken intelligently his advice is right.

There are many ways of doing it; so many that they are confusing to the average beekeeper. The prime requisite is a young and vigorous queen of a good strain, and the secondary is good combs. Given these and not too much manipulation the colonies will be ready when the flowers are.

Different sections produce different honeys—some fine, some good, and some indifferent or poor; so the first thing for the would-be successful honey-producer to do is to find out at what season the good honeys are secured. This is easily done by sampling the new honey whenever the bees are storing a surplus and tracing the bees to the flowers whence they get it. It is often quite as important to learn when the poor honey is gathered in order that the good may be secured separately from it.

When it comes to determining what honey is "good" many beekeepers will find themselves decidedly puzzled. They think one good while other persons do not like it. One palate is pleased with a strong flavoured honey; another wants something almost flavourless—just merely sweet.

In most regions good honey is secured from several sources, some, perhaps, coming early in the season, others late, and not infrequently poor honey coming in between. Perhaps the beekeeper does not secure enough of any one kind to supply his customers on one sort, and later gives them of the later crop only to have fault found because the honey tastes differently. The remedy is to hold all of the honey until the end of the season and then "blend" it.

No fixed rules can be given for blending. The proper proportions will have to be determined by experiment. Keep trying until it seems right, then "try it on the dog," which is to say, pass samples of the blend around among people and get their opinion. Eventually a combination will be secured which fits the palate of the community.

It sometimes happens that all the honeys of a region are too strong in flavour to be pleasing for steady consumption, and then it is necessary to buy a mild honey from some other region and soften the flavour by blending the strong with it.

The above advice will be understood to refer to extracted honey. This form of honey is steadily crowding out comb honey, and for several reasons. First, successful production of comb honey calls for more skillful beekeeping; secondly, it calls for a location where the honey flow is rapid and profuse; and, thirdly, it calls for more pains and care in preparation for market and in delivery than the average beekeeper seems able to give it. Also, many consumers do not like the wax and want the honey so that it can be used as syrups are used.

But even in locations where the honey flows are not conducive to successful production of comb honey on an extensive scale it is often possible to secure some choice comb honey which commands fancy prices.

The writer has proved the value of the advice above given. He has developed a blend of honeys which seems perfectly adapted to the local market. It is liked; repeat orders and new customers are the order of the day, and the honey sells for 20 per cent. more than any other honey on the market. And yet the region where it is produced is not considered a good honey section. As a whole it is not, but some parts of it at some seasons of the year give honey of exceptionally fine flavour, some of them a trifle too pronounced for steady eating, but ideal when used in the right proportion in a blend.

And in a few sections he secures a modest yield of comb honey from each hive, but this honey is a natural blend, the bees getting it from three or four sources at the same time, and the quality is so fine that it commands a very high price and is all engaged a year in advance. It pays to go to a lot of trouble to secure it, and even the modest per-colony yield returns in cash much more than the large per-colony yields of some other sections.

Study the honeys of your neighbourhood and work your colonies to secure all they can of the best.

Providence, Rhode Island, U.S.A.

## WHITEWASH FROM PRICKLY-PEAR.

In certain parts of Uruguay the farm buildings are a fine white colour even during the wet season. To obtain this appearance a whitewash is used, made of the sliced leaves of the prickly-pear, which, when macerated in water for twenty-four hours produce a solution of creamy consistence. To this lime is added and well mixed in. When the solution is applied to any surface, be it wood, iron, or other material, a beautiful pearly white appearance is produced which endures through rain and frost for many years. The editor of the "Cyprus Agricultural Journal" says that the solution has been tested in Cyprus with good results. It may be noted that this use of the prickly-pear is common in the West Indies.—"Agricultural News," Barbados.

# Entomology.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following notes from the Entomologist, Dr. J. F. Illingworth, upon investigations of the grub pest:—

Though this is the slack season in the activities of the grubs, we have been very busy in framing up our lines for attack, when they do become active again. The following list will not only serve to illustrate the comprehensiveness of these lines, but it will also indicate clearly the necessity for considerable additional assistance, if they are to be soon carried out. This assistance will be referred to again later:—

1. A study of the distribution of species with relation to soil, timber, cultural methods, &c.

2. Mapping of infested and non-infested regions.

3. Morphological study of reproductive organs of beetles, with relation to the period of ovipositing and the number of eggs produced.

4. Morphological study of the fungous parasites.

5. Breeding of the various local parasitic and predaceous insects in cages.

6. Introduction and breeding of beetle parasites from other countries.

7. Experimental methods for the rapid multiplication and wide distribution of our fungous parasites.

8. Introduction of bacterial and fungous enemies of the beetles from other countries.

9. A further study of various light-traps for the beetles.

10. A further study of repellents.

11. Field and laboratory experiments in the use of poisons for the grubs.

12. Field experiments to determine the relation of fertilisers to resistance; using green manure, stable manure, meatworks, nitrate of soda, &c.

13. A study of the effect of trash left on the field during the period of ovipositing of the beetles.

14. Also, having the ground covered with Mauritius beans during this period—planting cane in March.

15. Another experiment: Working the fallow soil during January and February and planting in March.

16. Experiments in late planting: Using plots planted in November and December, which are to be worked through the period of ovipositing.

17. Experiments to determine how far the beetles fly.

18. A study of varieties of cane best suited to grub resistance.

19. Experiments showing the value of lime on grub-infested soil.

20. Development of a general reference collection in the laboratory.

This list might be considerably extended; but, since several of the topics are so important that we might profitably occupy all of our time with one of them, it would appear best not to make the list too far-reaching. It is hoped, however, that we may soon have the assistance of students, who, while they are carrying out investigations along these various lines, will be gaining in practical experience and power, which will inevitably prove of great worth, both to the State and to themselves. Pests of tropical crops are omnipresent, and the call for trained men to cope with them will ever be insistent. Certainly, the expenditure for the permanent equipment of our new Experiment Station could not be put to better use.

Some recent observations that will prove of interest: Beetles were found, fully developed, in the soil at Greenhills, 24th July. These were in the hardest kind of soil, over 2 ft. from the surface, where they must wait for the rains to penetrate to them before they can emerge. It is very probable that a number of these must succumb if the rains are long delayed. Along the line of our investigations of the relation of humus to grub infestation, I learned, at Deral, that the grubs had been so abundant that a child picked up at the rate of about 8 lb. of grubs in a day; and still the cane showed no injury from them. The river-bottom land of that locality is exceedingly rich in humus, having been recently cleared from the scrub, and is subject to overflows.

## MUSHROOM KETCHUP.

Put the mushrooms, fully opened or large buttons, into a pan, breaking them in pieces. Strew salt over them; let them stand for four or five days; then mash them and squeeze them through a cloth; boil and skim the liquor; throw in black and red pepper, a little ginger, and some eschalot. Boil all together, and, when cold, bottle.

# General Notes.

## SOCIETIES.

Elimbah.—Elimbah Farmers and Settlers' Progress Association. H. L. Hall, secretary.

## ALGAROBA OR CAROB SEED.

We have received several inquiries concerning algaroba seed. We believe that there are some trees already bearing in Queensland, and would be glad to hear from growers if they have any seeds for disposal, as there appears to be a growing demand for them.

## CURING HAMS.

As soon as the hams are cut, tie them up by the hock for three days. Then make a pickle thus: 1 oz. of saltpetre, 8 lb. coarse sugar, ½ oz. salt prunella, 8 lb. common salt, 1 oz. juniper berries, and 1 gallon of strong beer. Boil all together, and when cold pour it over the hams. Turn them every day for a fortnight. This pickle is sufficient for two hams.

# Answers to Correspondents.

Louis Hoey, Brandon, Townsville—

## FERTILISING INGREDIENTS REMOVED FROM AN ACRE OF LAND BY A 30-TON CANE CROP.

1. What proportion of nitrogen, potash, phosphoric acid, and water would be removed from an acre of land from which 30 tons of cane have been harvested?—*Answer:* The amounts of fertilising ingredients vary according to locality and cane variety. A 30-ton crop of D 1135 removed per acre in lbs.—

| | Trash. Lb. | Top. Lb. | Crushable Cane. Lb. |
|---|---|---|---|
| Nitrogen .. .. | 40 .. | 33 .. | 64 |
| Potash .. .. | 15 .. | 44 .. | 25 |
| Phosphoric acid .. | 7 .. | 10 .. | 23 |

2. Plans of modern farm buildings—milksheds, dairy, piggeries, and poultry-yards—have been forwarded as requested.

3. For roofing: Ruberoid or, if timber is plentiful, ironbark or pine shingles. Split shingles are preferable to sawn, as the former will not warp. Ironbark shingles discolour the rain water for a considerable time.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR OCTOBER, 1917.

| Article. | | OCTOBER. Prices. |
|---|---|---|
| Bacon | lb. | 9½d. to 10d. |
| Barley | bush. | 2s. to 5s. 6d. |
| Bran | ton | £6 3s. |
| Broom Millet | „ | £20 to £25 |
| Butter | cwt. | 149s. 4d. |
| Chaff, Mixed | ton | £4 to £6 |
| Chaff, Oaten | „ | £7 to £7 10s. |
| Chaff, Lucerne | „ | £5 to £6 |
| Chaff, Wheaten | „ | £3 15s. to £4 |
| Cheese | lb. | 9½d. to 10d. |
| Flour | ton | £12 |
| Hams | lb. | 1s. 3d. to 1s. 4d. |
| Hay, Oaten | ton | £6 15s. to £7 15s. |
| Hay, Lucerne | „ | £4 to £4 10s. |
| Honey | lb. | 5d. |
| Maize | bush. | 3s. 9d. to 3s. 10d. |
| Oats | „ | 1s. 6d. to 2s. 6d. |
| Onions | ton | £23 to £24 |
| Peanuts | lb. | 5d. to 6d. |
| Pollard | ton | £7 |
| Potatoes | „ | £13 10s. to £19 10s. |
| Potatoes (Sweet) | cwt. | 2s. to 3s. |
| Pumpkins (Cattle) | ton | £5 |
| Eggs | doz. | 7d. to 9d. |
| Fowls | per pair | 4s. to 6s. 3d. |
| Ducks, English | „ | 4s. to 4s. 6d. |
| Ducks, Muscovy | „ | 5s. to 7s. 6d. |
| Geese | „ | 7s. to 8s. |
| Turkeys (Hens) | „ | 9s. to 11s. |
| Turkeys (Gobblers) | „ | 15s. to 20s. |
| Wheat | bush. | 3s. 6d. to 4s. 9d. |

## VEGETABLES—TURBOT STREET MARKETS.

| | |
|---|---|
| Asparagus, per dozen bundles | 6s. to 10s. |
| Cabbages, per dozen | 1s. to 3s. |
| Cauliflowers, per sack | 3s. to 5s. |
| Celery, per bundle | ... |
| Beans, per sugar bag | 6s. to 12s. |
| Peas, per sugar bag | 7s. to 12s. |
| Carrots, per dozen bunches | 1s. 5d. to 1s. 6d. |
| Beetroot, per dozen bunches | 9d. to 1s. |
| Lettuce, per dozen | 1s. to 2s. |
| Parsnips, per bundle | 7d. to 10d. |
| Sweet Potatoes, per cwt. | 2s. 6d. to 2s. 9d. |
| Table Pumpkins, per dozen | 7s. to 8s. |
| Marrows, per dozen | 1s. 6d. to 7s. |
| Rhubarb, per dozen bundles | ... |
| Tomatoes, per case | 5s. to 12s. |
| Cucumbers, per case | 9s. to 10s. 6d. |

## SOUTHERN FRUIT MARKETS.

| Article. | OCTOBER. Prices. |
|---|---|
| Bananas (Queensland), per crate | 10s. to 11s. |
| Bananas (Tweed River), per case | ... |
| Bananas (Fiji), per case | 10s. to 14s. |
| Bananas (G.M.), per bunch | ... |
| Bananas (G.M.), per case | ... |
| Guavas, per case | ... |
| Lemons (Local), per case | 4s. to 10s. |
| Mandarins, per case | 6s. to 12s. |
| Mangoes, per case | 10s. to 12s. |
| Oranges (Navel), per case | 14s. to 16s. |
| Oranges (Seville), per bushel-case | 7s. |
| Oranges (other), per case | 11s. 8d. |
| Papaw Apples, per half-bushel-case | 8s. to 12s. |
| Passion Fruit, per half-case | 8s. 5d. to 9s. 5d. |
| Pineapples (Queens), per double-case | 7s. to 10s. |
| Pineapples (Ripleys), per double-case | 6s. to 8s. |
| Pineapples (Common), per double-case | 6s. to 8s. |
| Tomatoes (Queensland), per half-bushel-case | 6s. to 8s. |
| Cucumbers, per bushel | 7s. to 9s. |
| Strawberries (Queensland), per tray | ... |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | OCTOBER. Prices. |
|---|---|
| Apples, Eating, per bushel-case | 21s. to 24s. |
| Apples, Cooking, per bushel-case | 18s. to 20s. |
| Bananas (Cavendish), per dozen | 1d. to 4½d. |
| Bananas (Sugar), per dozen | 1d. to 4½d. |
| Cape Gooseberries, per quarter-case | 8s. to 10s. |
| Citrons, per hundredweight | 11s. |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per quarter-case | 4s. to 5s. |
| Custard Apples, per tray | ... |
| Lemons (Lisbon), per case | 6s. to 7s. |
| Limes, per tray | ... |
| Mandarins, per case | 3s. to 9s. |
| Mangoes, per case | 4s. to 9s. |
| Oranges (Navel), per case | 12s. to 12s. 9d. |
| Oranges (Seville), per hundredweight | 3s. 6d. to 10s. |
| Oranges (other), per case | 6s. to 8s. |
| Papaw Apples, per quarter-case | 1s. to 2s. 3d. |
| Passion Fruit, per quarter-case | 10s. to 13s. 6d. |
| Pears, per quarter-case | 19s. to 21s. |
| Peanuts, per lb. | 5d. to 6d. |
| Persimmons, per quarter-case | ... |
| Pineapples (Ripleys), per dozen | 1s. 6d. to 3s. 6d. |
| Pineapples (Rough), per dozen | 1s. to 3s. |
| Pineapples (Smooth), per dozen | 1s. 6d. to 3s. 5d. |
| Strawberries, per tray | 1s. to 3s. 6d. |
| Tomatoes, per case | 5s. to 12s. |

## TOP PRICES, ENOGGERA YARDS, SEPTEMBER, 1917.

| Animal. | SEPTEMBER. Prices. |
|---|---|
| Bullocks ... ... ... ... ... ... ... ... | £26 10s. to £29 5s. |
| Bullocks (Single) ... ... ... ... ... ... | ... |
| Cows ... ... ... ... ... ... ... ... | £14 7s. 6d. to £18 |
| Merino Wethers ... ... ... ... ... ... ... | 53s. 9d. |
| Crossbred Wethers ... ... ... ... ... ... | 41s. 9d. |
| Merino Ewes ... ... ... ... ... .. ... | 14s. 3d. |
| Crossbred Ewes ... ... ... ... ... ... ... | 33s. 9d. |
| Lambs ... ... ... ... ... ... ... ... | 43s. 3d. |
| Pigs (Porkers) ... ... ... ... ... ... ... | 66s. |

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF SEPTEMBER, 1917, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING SEPTEMBER, 1917 AND 1916, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | | Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|---|---|---|---|---|
| | Sept. | No. of Years' Records. | Sept., 1917. | Sept., 1916. | | Sept. | No. of Years' Records. | Sept., 1917. | Sept., 1916. |
| *North Coast.* | In. | | In. | In. | *South Coast—continued:* | In. | | In. | In. |
| Atherton ... ... | 0·54 | 15 | 0·48 | 2·05 | Nambour ... ... | 2·28 | 20 | 5·30 | 5·06 |
| Cairns ... ... | 1·65 | 34 | 1·00 | 4·50 | Nanango ... ... | 1·83 | 34 | 7·11 | 2·98 |
| Cardwell ... ... | 1·44 | 44 | 1·12 | 2·36 | Rockhampton ... | 1·35 | 29 | 3·68 | 0·92 |
| Cooktown ... ... | 0·56 | 40 | 0·12 | 1·47 | Woodford ... ... | 2·12 | 29 | 4·14 | 3·77 |
| Herberton ... ... | 0·46 | 29 | 0·02 | 1·42 | | | | | |
| Ingham ... ... | 1·09 | 24 | 1·25 | 0·75 | | | | | |
| Innisfail ... ... | 3·58 | 35 | 2·51 | 6·49 | | | | | |
| Mossman ... ... | 1·34 | 5 | 1·18 | 3·36 | *Darling Downs.* | | | | |
| Townsville ... ... | 0·81 | 45 | 0·23 | 0·03 | | | | | |
| | | | | | Dalby ... ... | 1·78 | 46 | 5·82 | 0·87 |
| *Central Coast.* | | | | | Emu Vale ... ... | 1·79 | 20 | 4·51 | 2·25 |
| | | | | | Jimbour ... ... | 1·62 | 28 | 6·58 | 0·50 |
| Ayr ... ... ... | 1·79 | 29 | 0·22 | 0·19 | Miles ... ... | 1·41 | 31 | 5·92 | 0·45 |
| Bowen ... ... | 0·87 | 45 | 0·18 | 0·84 | Stanthorpe ... | 2·47 | 43 | 7·28 | 1·80 |
| Charters Towers ... | 0·85 | 34 | 0·71 | 0·03 | Toowoomba ... | 2·19 | 44 | 6·62 | 3·63 |
| Mackay ... ... | 1·59 | 45 | 0·70 | 0·11 | Warwick ... ... | 1·88 | 29 | 6·90 | 1·32 |
| Proserpine ... ... | 2·15 | 13 | 1·45 | 3·32 | | | | | |
| St. Lawrence ... | 1·38 | 45 | 2·59 | 0·27 | *Maranoa.* | | | | |
| | | | | | Roma ... ... | 1·54 | 42 | 7·07 | 0·77 |
| *South Coast.* | | | | | | | | | |
| | | | | | *State Farms, &c.* | | | | |
| Biggenden ... ... | 1·66 | 17 | 7·02 | 2·34 | | | | | |
| Bundaberg ... ... | 1·81 | 33 | 3·54 | 4·23 | Bungeworgorai ... | .. | ... | ... | 0·77 |
| Brisbane ... ... | 2·09 | 66 | 5·21 | 2·81 | Gatton College ... | 1·54 | 17 | 7·50 | 1·84 |
| Childers ... ... | 1·98 | 21 | 3·98 | 3·24 | Gindie ... ... | 0·85 | 17 | 3·57 | 0·06 |
| Crohamhurst ... | 2·53 | 25 | 5·81 | 5·18 | Hermitage ... | 1·45 | 10 | 6·56 | 1·54 |
| Esk ... ... ... | 2·26 | 29 | 7·16 | 2·85 | Kairi ... ... | 1·07 | 4 | 0·66 | 1·76 |
| Gayndah ... ... | 1·58 | 45 | 5·28 | 1·46 | Kamerunga ... | 1·13 | 26 | 0·70 | 4·44 |
| Gympie ... ... | 2·10 | 46 | 3·57 | 4·03 | Sugar Experiment Station, Mackay | 1·49 | 19 | 0·60 | 0·44 |
| Glasshouse M'tains | 1·71 | 8 | 5·60 | 3·13 | Warren ... ... | 0·93 | 5 | 3·70 | 0·53 |
| Kilkivan ... ... | 1·75 | 37 | 4·17 | 1·69 | | | | | |
| Maryborough ... | 1·94 | 45 | 3·63 | 3·81 | | | | | |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for September this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

# ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

## TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON

| 1917. | SEPTEMBER. | | OCTOBER. | | NOVEMBER. | | DECEMBER. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·2 | 5·34 | 5·29 | 5·47 | 4·59 | 6·5 | 4·46 | 6·28 |
| 2 | 6·1 | 5·34 | 5·28 | 5·48 | 4·58 | 6·6 | 4·46 | 6·28 |
| 3 | 6·0 | 5·35 | 5·27 | 5·48 | 4·58 | 6·7 | 4·46 | 6·29 |
| 4 | 5·59 | 5·35 | 5·26 | 5·49 | 4·57 | 6·7 | 4·46 | 6·30 |
| 5 | 5·58 | 5·36 | 5·25 | 5·49 | 4·57 | 6·8 | 4·46 | 6·31 |
| 6 | 5·57 | 5·36 | 5·24 | 5·50 | 4·56 | 6·9 | 4·46 | 6·32 |
| 7 | 5·55 | 5·36 | 5·23 | 5·50 | 4·55 | 6·9 | 4·46 | 6·32 |
| 8 | 5·54 | 5·37 | 5·22 | 5·51 | 4·54 | 6·10 | 4·46 | 6·33 |
| 9 | 5·53 | 5·37 | 5·20 | 5·51 | 4·54 | 6·11 | 4·47 | 6 33 |
| 10 | 5·52 | 5·38 | 5·19 | 5·52 | 4·53 | 6·11 | 4·47 | 6·34 |
| 11 | 5·51 | 5·38 | 5·18 | 5·52 | 4·52 | 6·12 | 4·47 | 6 34 |
| 12 | 5·50 | 5·39 | 5 17 | 5·53 | 4·52 | 6·13 | 4·47 | 6·35 |
| 13 | 5·49 | 5·39 | 5·16 | 5·53 | 4·51 | 6·14 | 4·47 | 6·35 |
| 14 | 5·48 | 5·40 | 5·15 | 5·54 | 4·51 | 6·15 | 4·48 | 6·36 |
| 15 | 5·47 | 5·40 | 5.14 | 5·54 | 4·50 | 6·16 | 4·48 | 6·36 |
| 16 | 5·45 | 5·41 | 5·13 | 5·55 | 4·50 | 6·17 | 4·48 | 6·37 |
| 17 | 5·44 | 5·41 | 5·12 | 5·55 | 4·49 | 6·18 | 4·48 | 6·38 |
| 18 | 5·43 | 5·42 | 5·11 | 5·56 | 4·49 | 6·19 | 4·49 | 6·39 |
| 19 | 5·42 | 5·42 | 5·10 | 5·56 | 4·48 | 6·19 | 4·49 | 6·40 |
| 20 | 5·41 | 5·42 | 5.9 | 5·57 | 4·48 | 6·20 | 4·50 | 6·40 |
| 21 | 5·40 | 5·43 | 5·8 | 5·57 | 4·47 | 6·21 | 4·50 | 6·41 |
| 22 | 5·39 | 5·43 | 5·7 | 5·58 | 4·47 | 6·22 | 4·51 | 6·42 |
| 23 | 5·37 | 5·44 | 5·6 | 5·59 | 4·47 | 6·22 | 4·51 | 6·42 |
| 24 | 5·36 | 5·44 | 5·5 | 5·59 | 4·47 | 6·23 | 4·52 | 6·43 |
| 25 | 5·35 | 5·45 | 5·4 | 6·0 | 4·47 | 6·24 | 4·52 | 6·43 |
| 26 | 5·34 | 5·45 | 5·3 | 6·0 | 4·46 | 6·24 | 4·53 | 6·43 |
| 27 | 5·33 | 5·45 | 5·3 | 6·1 | 4·46 | 6·25 | 4·53 | 6·44 |
| 28 | 5·32 | 5·46 | 5·2 | 6·1 | 4·46 | 6·26 | 4·54 | 6·44 |
| 29 | 5·31 | 5·46 | 5·1 | 6·2 | 4·46 | 6·26 | 4·55 | 6·44 |
| 30 | 5·30 | 5·47 | 5·0 | 6·3 | 4·46 | 6·27 | 4·56 | 6·45 |
| 31 | ... | ... | 5·0 | 6·4 | 4·46 | ... | 4·57 | 6·45 |

The times given are for the whole of Queensland, New South Wales, and Victoria, where the same Standard Time is observed.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 1 | Sept. | ○ Full Moon | 10 | 28 | p.m. |
| 8 | ,, | ☽ Last Quarter | 5 | 5 | ,, |
| 16 | ,, | ● New Moon | 8 | 28 | ,, |
| 24 | ,, | ☾ First Quarter | 3 | 41 | ,, |

The Moon will be at its greatest distance from the earth at midnight on the 14th, and at its least distance on the night of the 30th.

| | | | | | |
|---|---|---|---|---|---|
| 1 | Oct. | ○ Full Moon | 6 | 31 | a.m. |
| 8 | ,, | ☽ Last Quarter | 6 | 14 | p.m. |
| 16 | ,, | ● New Moon | 12 | 41 | ,, |
| 24 | ,, | ☾ First Quarter | 12 | 38 | a.m. |
| 30 | ,, | ○ Full Moon | 4 | 19 | p.m. |

The moon will be furthest from the earth on the 12th, and nearest to it on the 28th.

| | | | | | |
|---|---|---|---|---|---|
| 7 | Nov. | ☽ Last Quarter | 3 | 4 | a.m. |
| 15 | ,, | ● New Moon | 4 | 28 | ,, |
| 22 | ,, | ☾ First Quarter | 8 | 29 | ,, |
| 29 | ,, | ○ Full Moon | 4 | 41 | ,, |

The Moon will be furthest from the earth on the 9th, and nearest to it on the 24th.

| | | | | | |
|---|---|---|---|---|---|
| 7 | Dec. | ☽ Last Quarter | 12 | 14 | a.m. |
| 14 | ,, | ● New Moon | 7 | 17 | p.m. |
| 21 | ,, | ☾ First Quarter | 4 | 7 | ,, |
| 28 | ,, | ○ Full Moon | 7 | 52 | ,, |

The Moon will cause an *Annular Eclipse* of the *Sun* on December 14th, but it will not be visible in Queensland. On the 28th there will be a *Total Eclipse* of the *Moon* between 7.38 and 7.55 p.m. It will be partly eclipsed for an hour and a-half before and after totality.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during September, October, and November, may be roughly arrived at by adding 16 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

# RECRUITING.

## ORGANISATION AND STAFF.

**Federal.**—Director-General of Recruiting: The Honourable Donald MacKinnon, M.L.A. Secretary: Captain W. A. Robinson.

**States.**—State recruiting committees, State organising secretaries. Federal electorate executive committees, local recruiting committees, recruiting officers, organisers.

## STATE RECRUITING COMMITTEES.

A State recruiting committee in each State will be nominated by the Director-General of Recruiting.

The Director-General of Recruiting will correspond direct with them, and they with him, on general matters affecting the civil organisation.

These committees will exercise authority and supervision over all electorate and local committees, and will guide and direct the general policy to be adopted in this organisation of each particular State subject to the direction of the Director-General of Recruiting.

## STATE ORGANISING SECRETARIES.

The State organising secretaries will act as secretaries to State committees and will be vested with the authority to carry out the directions of the State Committee. They will co-ordinate the military and civil organisations.

They will be given a free hand in all matters, other than financial, pertaining to general organising methods, subject to the direction of the Director-General of Recruiting and of the State Committee.

Recruiting officers in Federal electorates will be under the immediate control of the State organising secretaries.

Organisers attached to the staff of recruiting officers will be subject to the immediate control of such officers and will form part of the staff of the State recruiting committees, and will be appointed by such committees. State committees will, in a general way, advise and direct electorate committees in matters of policy and procedure.

State organising secretaries will certify, where necessary, to the payment of salaries, allowances, and expenses of recruiting officers, staffs, and local committees.

They will furnish progress reports at stated times to the Director-General of Recruiting.

## FEDERAL ELECTORATE COMMITTEES.

The Federal Electorate Committee in each Federal electorate shall consist of seven members. The members of these committees will be appointed at a duly convened conference of three delegates from each local war service or recruiting committee.

The Federal member for the electorate will be ex officio chairman of this committee. Members of the Senate for each State shall be ex officio members of any committee or group of committees that may suit their convenience as indicated by them to the State Organising Secretary. All State members whose electorates are altogether or mainly within the Federal electorate will be also ex officio members of this committee.

A vice-chairman will be appointed in every instance.

## LOCAL RECRUITING COMMITTEES.

Local recruiting committees shall be formed in each government area, and, if considered desirable, as in the case of shires, in towns within the shires which are centres of population, or in the case of metropolitan municipalities in the different wards or subdivisions.

The existing war service committees and local recruiting committees will be the basis of local organisation, provided that such committees agree to immediately call public meetings in conjunction with mayors and presidents, with a view to increasing their membership. The committees should be increased to the greatest extent, with power to add to their numbers. They might aim at embracing all men and women in their districts who are prepared to assist in endeavouring to win the war.

An executive committee of seven should be appointed by each local committee.

## RECRUITING OFFICERS.

One or more recruiting officers, not necessarily holding military rank, will be stationed in a central town or towns in each Federal electorate.

One of such officers shall be the secretary and organiser to the Federal Electorate Committee in each electorate.

When a civilian is appointed a recruiting officer he shall receive a salary at the rate of £250 per annum, with travelling expenses, when absent from his head station, at the rate of 10s. per day.

Recruiting officers are to exclusively devote their attention to recruiting organisation, and must not engage in any occupation whilst holding this position.

The area officer in each training area will carry out his area duties independently of the recruiting officer, who may be stationed in the same locality. He must however, be always prepared to assist the recruiting officer when required, and should lose no opportunity of enrolling recruits, notifying the recruiting officer of the action taken, and making the necessary arrangements as to medical examination and transit through such recruiting officer.

## ORGANISERS.

Organisers may be appointed in each Federal electorate, and these men should be suitable discharged returned soldiers appointed as civilians, civilians not eligible for active servce, or civilians who, having volunteered for active service, have been rejected.

They must be men of recognised organising ability.

All recruiting sergeants shall be immediately withdrawn and their appointments terminated.

Organisers will be paid £4 per week, and 10s. per day travelling expenses when absent from their head station.

## FINANCIAL ARRANGEMENTS.

The salaries, allowances, and expenses of the Federal Secretary and State secretaries, recruiting officers, organisers, and staff shall be paid by the district paymaster of each military district.

Each State Recruiting Committee shall be provided with a fund to meet emergency and minor expenses of the compaign. The endorsement of the State Recruiting Committee, certified by the chairman or vice-chairman and secretary, will be a sufficient authority for the payment of all expenses.

A general financial instruction thereon will be issued by the finance member of the Military Board.

## ENROLMENT AND MEDICAL EXAMINATION OF RECRUITS.

Recruits may enlist at any time, and at time of enlistment may specify any definite subsequent date to meet their convenience on which they will go into camp.

All recruits should be medically examined, A.I.F. standard, and such examination will be deemed to be final.

In cases where an A.M.C. doctor is not available, the recruiting officer will make the necessary arrangements for the recruit to be examined by the nearest Government Medical Officer, and, if passed by him as fit, the recruit will be provided with a rail, coach, or boat warrant to the nearest centre where an A.M.C. doctor is stationed.

Recruits passed as fit will be sworn in, after which leave will be granted until the date specified as the time when the recruit is prepared to enter camp.

A leave pass will be issued to the recruit. Such pass to show date of enlistment and the date when recruit is to report for the purpose of entering camp.

The State Committee in each military district must be notified of every enlistment. A notice of enlistment card must be prepared in duplicate in respect to each recruit in accordance with pro forma issued herewith. One copy shall be filed in the office of each recruiting officer and the other forwarded to the Organising Secretary of the State Recruiting Committee.

In addition thereto, notice of each enlistment will be forwarded to each local committee concerned.

# Farm and Garden Notes for December.

Too much care can scarcely be bestowed upon potatoes dug up this month to protect them from the sun. They should be dug or ploughed out as soon as the skin is firm, as they are liable to rot in the ground owing to the great heat.

Field.—The wheat harvest will be now nearing completion, and to all appearance, while the results are not likely to contribute a record, owing to the dry spell in the early stages of the crop, still the subsequent seasonable rains effected a wonderful change in the young crops. Nevertheless, succeeding dry weather had a bad effect on the crop, consequently the yield of the coming harvest will be far short of that of 1916, being roughly estimated at about 1,750,000 bushels. The estimates of the probable yield have varied so considerably that it will be well to wait until the entire harvest is over before speculating on the result. This State is a long way from becoming a wheat-exporting country. The principal factor operating against a still greater extension of the wheat-growing industry is that many farmers who formerly grew wheat and barley have turned their attention to dairying, which offers larger and quicker returns.

Given favourable weather, maize, panicum, imphee, kafir corn, and the various millets may be sown.

Cotton sown in October and November will be making great headway, owing to the September and October rains. Keep down all weed growth by scarifying as long as the growth will admit of horse work. Tree cottons, such as Sea Island and Caravonica, should be topped and pruned.

Kitchen Garden.—Gather cucumbers, melons, vegetable marrows, and French beans as soon as they are fit for use. Even if they are not required, still they should be gathered, otherwise the plants will leave off bearing. Seeds of all these may be sown for a succession. Sow cabbage and cauliflower seed. Great difficulty will be experienced in getting these to grow at this season, and the plants will consequently be more valuable in proportion. Tomatoes should be in full bearing, and the plants should be securely trained on trellises or stakes. Take up onions, and spread them out thinly on the barn floor until the tops wither sufficiently to pull off easily. They should then be graded into sizes, and sent to market or stored in a cool place. Where there is an unlimited supply of water, and where shade can be provided, lettuce and other salad plants may still be sown. All vacant ground should be well manured and dug two spits deep. Manure and dig as the crops come off, and the land will be ready for use after the first shower.

Flower Garden.—Keep the surface of the land well stirred. Do not always stir to the same depth, otherwise you are liable to form a "hard pan," or caked surface, beneath the loose soil. Alternate light

with deep hoeings. A few annuals may still be planted, such as balsams, calendulas, cosmos, coreopsis, marigold, nasturtium, portulaca, zinnia, and cockscomb. Plant out whatever amaranthus may be ready. These may still be sown in boxes. Clear away all annuals which have done flowering. Bulbs should have all the dead leaves cut away, but the green leaves should not be touched. Stake chrysanthemums, and, as the flower buds develop, give them weak liquid manure. Coleus may now be planted and propagated from cuttings. Dahlias are in various stages, but the greater part will have been planted by this time. Give them liquid manure, and never let them dry up. Lift narcissus about the end of the year, but do not store them. Plant them out at once in their new positions. Top-dress all lawns.

# Orchard Notes for December.

## THE SOUTHERN COAST DISTRICTS.

December is somewhat an off month for pines, though bananas should be improving both in quality and quantity. The purely tropical summer ripening fruits are not yet ready, and, consequently, there is only a limited supply of fruit in this part of Queensland during the month.

Early ripening varieties of grapes will mature, and care should be taken to market them in good order. The first fruit to ripen should be put up in small packages, as, if marketed in this manner, it will fetch a better price, but as it becomes more plentiful it can be packed in larger cases.

Pay particular attention during the month to all peaches, apples, pears, Japanese plums, or other fruits that are liable to be attacked by fruit fly, and see that no fly-infested fruits are allowed to lie about under the trees, and thus breed out a great crop of flies that will be ready to destroy the grape and mango crops as they mature.

If the month is dry see that the orchard is kept well worked so as to retain moisture in the soil, and, in any case, even should there be a good rainfall, it is necessary to cultivate in order to keep down weed growth, as if weeds are not kept in check now there is little chance of their being kept in hand once the January and February rains set in.

The planting out of pineapples, bananas, and most kinds of tropical fruits can be carried out during the month, especially if there is any rainy weather; but, if the weather is dry, it is better to defer the planting out of tropical fruits till January or February.

The cyaniding of citrus trees can be continued when necessary, and where Maori or orange mite is showing it should be checked at once, as Maori fruit is of no use for the Southern markets, and is unsuitable for export to the old country.

## THE TROPICAL COAST DISTRICTS.

Clean up all orchards and pineapple and banana plantations as long as you have the chance of fine weather, so as to have your land in good order when the wet season commences, as once the rain sets in there is little chance of fighting weeds. Watch bananas carefully for fly, and market the fruit in good order. Handle the crop of pines carefully; don't let the fruit get too ripe, as an over-ripe Northern pine is tasteless. The fruit should be cut as soon as it is fully grown, as even when quite green the rough-leaf varieties have usually developed sufficient sugar to suit most persons' taste. Pack carefully to prevent bruising, and they will carry South in good order.

Only send high-class mangoes South—bad-flavoured sorts, and stringy, carroty, or turpentine flavoured varieties are not worth shipping. High-class fruit will pay to handle carefully, but there is no demand for rubbish, and I am sorry to say that fully 90 per cent. of the mangoes grown in the State must be classed under the latter heading.

Tropical fruits of all kinds can be set out during suitable weather. Fruit pests of all sorts must be systematically fought.

## THE SOUTHERN AND CENTRAL TABLELANDS.

December is a busy month for the growers in the Stanthorpe district. Early apples, plums, peaches, nectarines, &c., will ripen during the month, and must be marketed as soon as ripe, as they do not keep long once they are gathered. Handle carefully, and grade better; there is far too much early rubbish slumped on to the local markets, which tends to spoil the demand as well as the price. Watch the orchards very carefully for codling moth and fruit fly, and take every possible precaution to keep these pests in check should they make their appearance, as the future cleanliness of the orchard depends very largely on the care that is taken now to keep these pests in check.

If the month is dry, keep the orchard and vineyard well cultivated. Watch the vines carefully so as to detect the first signs of Oidium or Anthracnose, and systematically fight these pests, remembering always that in their case prevention is better than cure, and that only prompt action is of the slightest value.

On the Darling Downs every care must be taken to keep the fruit-fly in check, and on no account must infested fruit be allowed to lie about under the trees, as this is far and away the best method of propagating the pest wholesale.

In the Central District the grape crop will ripen during the month. Handle the fruit carefully. Cut it when dry, and where it has to be sent long distances to market pack in 6-lb. baskets rather than in larger cases. Where dry keep the orchard and vineyard well cultivated, and where the citrus and other fruit trees require it give them an irrigation. Don't irrigate grapes once the seeds have been formed, as it tends to deteriorate the quality, and to make the fruit tender and consequently to carry badly.

QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## RICE-GROWING.

As there appears to be a recrudescence of the rice-growing industry in the North, the Department of Agriculture, in order to afford every facility for farmers to again take up this branch of agriculture, has purchased the ricemill, huller, and polisher which were worked successfully about the year 1909 by Mr. W. Heck, who owned a sugar-mill on Pimpama Island. The machinery was capable of turning out half a ton of dressed rice per day, and has been so well cared for that it is equal to doing as much good work as when first installed at Pimpama.

At Cairns, in times past, a good deal of rice was grown, and a ricemill was installed, which did good work, about the same year.

To-day Mr. Keane, Mareeba, is one of the rice-growers of the North, and Mr. N. A. R. Pollock, of Tolga, has also embarked in this industry.

The Department of Agriculture, being desirous of assisting any new industry giving promise of success, is sending the necessary machinery, on loan, for the benefit of prospective growers at and around Tolga, about 64 miles from Cairns. The Department has a large quantity of seed for distribution, all of the Mountain Rice variety, and incidentally for growers, from Cairns to Mareeba. At Mareeba, Mr. Keane has been very successful in rice-growing, and has distributed a quantity of paddy (seed rice) to his neighbours. This action of the Department should, and no doubt will, in the near future, result in an extended cultivation of rice. We have, in Queensland, not only the rice trade of the State to supply,

but also an excellent market for the product in British New Guinea, which annually imports large quantities of rice (Java-grown, or, at all events, not white-grown). This lucrative trade should be commandeered by Queensland, and, with our soil and climate, rice produced by white labour should be able to compete with that grown in black-labour countries.

Some years ago we published several articles on rice-growing, and this is an opportune time to give all possible information on the subject, since the Department has obtained the necessary machinery for turning out a marketable product equal, if not superior, to any imported grain.

We have pointed out that if the farmers of Queensland would take up rice-growing in earnest, there is a large market awaiting them in Papua. In corroboration of this, we find in the "Papuan Courier," 31st August, the following statement as to the rice shortage in Samarai:—

"There has been a shortage of rice here for some time, and the position became more acute on account of the southern steamer cutting out a trip. It was expected that this would be relieved by the arrival of the 'Wakefield' with a consignment, but unfortunately she brought no rice at all for Samarai. Owing to the urgency of the matter it was deemed advisable to send the 'Wakefield' straight back to Port Moresby, to bring along a shipment, and she left here on Monday morning with that purpose."

Why should there be any shortage of rice in Papua, when there are districts which we ourselves have visited, all along the southern and south-eastern coasts of the Territory, eminently adapted to the growth of Upland rice? and, furthermore, this country is so well watered that swamp rice could well be produced provided sufficient native labour could be relied on. It would well pay Queensland farmers to grow rice for sale in Papua, with benefit to that country, in the matter of freight charges alone. There are scarcely any tropical products such as coffee, tobacco, vanilla, cocoa, cotton, spices, rubber, &c., which cannot be profitably grown in that country. Tea, also, should succeed well in the mountainous districts, especially at Sogeri.

In September, 1909, Mr. F. W. Peek, Loganholme, wrote a paper on rice-growing which may be considered a good text-book for present-day growers. Mr. Peek's paper, which we reprint, dealt with rice-growing in the Logan district, but it is equally applicable to the Cairns, Mareeba, Tolga, Youngaburra, and other agricultural districts in that part of Queensland.

Many people are possessed with the idea that rice can only be grown in tropical swamps. This is too common an error. Large areas of the State are eminently adapted to rice culture, and very paying returns have been received—especially at Cairns, in the North, and in the Southern coast districts—by those who cultivated what is known as Upland or Mountain rice. There is no more trouble in growing rice than in growing wheat. Swamps and irrigation canals are not wanted. The land can be ploughed and prepared as for wheat, and the crop harvested in the same manner.

Here follows Mr. Peek's paper, which is as applicable to rice-growing to-day as when written in 1909, entitled—

## RICE-GROWING IN THE LOGAN DISTRICT, AND ITS PREPARATION FOR MARKET.

### Introduction and Early Cultivation.

In writing up this article (by special request), I will endeavour to make the information contained as intelligible as possible to the ordinary farmer and agriculturist. Of the value of rice there can be no two expressions of opinion, as this cereal forms the chief food supply of over one-half of the entire human race, and certainly there is not another product or cereal that, commercially or economically, obtains the same value as rice.

The varieties of rice to be obtained from the various countries where rice forms one of the staple crops for food supply, are innumerable, running into several hundred varieties, particularly where it is grown largely, as in India, China, Japan, Siam, West Indies, and in other parts of the world, and it has been found that local names have been given to rice of the same variety and quality. For general purposes and distinction, rice has been classified into three distinct varieties or classes. These are known to us as the "Aus," or upland rice; the "Aman," or swamp rice; and the "Boro," another swamp rice, or a variety requiring inundation, warm climate, and rapid growth, and producing a large coarse grain, but which, so far as I have been able to ascertain, has not been tried or cultivated in Queensland up to the present. The portion of the Logan district where rice was extensively cultivated is known as Pimpama Island, which is situated in the south-eastern portion of the State, in 153 degrees east longitude and between 27 and 28 degrees south latitude, and is approached from Brisbane by means of the South Coast Railway, one of the prettiest views in the Logan district, dotted from base to summit with its settlers' homes and splendidly laid out farms. The dark-green patches of sugar-cane, bananas, maize, and other crops, strongly contrasting with the rich red volcanic soil visible here and there, make a picture of agricultural industry both pleasing and effective, and one of which the district is justly proud.

What is known as "Pimpama Island" is the land lying between the Logan, Albert, and Pimpama Rivers, which are connected by a series of creeks and swamps with a long frontage to the Pacific Ocean or Moreton Bay, containing several thousand acres of rich coastal land, interspersed with large areas of ti-tree swamps, the water of which is brackish and undrinkable. The soil cultivated, and which has proved itself best adapted to the growth of rice, is of a sandy, loamy nature in appearance, but containing in a remarkable degree the constituents most suited to the nature and requirements of the plant, being easy of working, although slightly tenacious in wet or showery weather, but of very shallow depth in some places. Layers of decomposed marine shells are found in rather large quantities, pointing out that the lands were once ocean-washed, and the receding waters have left valuable deposits of lime and other constituents in the soil, which, together with the rich humus formed by

the decaying foliage of scrub vines, palms, ferns, &c., of rank tropical growth, have left these patches of soil of varying area between the swamps most suitable for rice culture.

The value of the land averages from £2 10s. to £6 per acre without improvement, and very little, if any, remains unalienated, it being so close to Brisbane, and the Logan district being one of the first settled districts of the colony, all the best lands were early availed of for cultivation. Who first introduced the rice seed of commercial value to Queensland appears to be undecided; but our late State Botanist, Mr. F. M. Bailey, has described a species of wild rice (*Oryza sativa*), a native plant of North Queensland, growing in the swampy lands there, as being



PLATE 34.—RICE LAND, PIMPAMA ISLAND.

indigenous to this State; also, the Chinese have grown rice rather extensively on the North Queensland river banks, particularly near Cairns, in patches for many years past, and which has met with a ready sale when placed on the market.

But it is to Mr. A. J. Boyd, the present editor of the "Queensland Agricultural Journal," that the credit is due of the introduction, in 1869, of rice-growing in the Logan district—he having procured the seed and planted it as an experimental crop at his sugar plantation, Ormeau, which he then had at Pimpama. The seed was one of the Japan varieties, with which he met fair success as regards the growth and result. Since that

time, from the seed Mr. Boyd raised and distributed, other settlers have taken up the matter of rice-growing at various times and in a fitful manner, the largest local planter some fifteen years ago being Claus Lahrs, an enterprising German settler, who planted at Pimpama Island two or three varieties of the China and Japan rices, but, owing to the seed not being tested or acclimatised, he met with but indifferent success. He even went so far as to incur the expense of erecting a mill for dressing the paddy (as rice in husk is termed), but after a few years he gave it up, partly because of the machinery, not being of the best description for dressing the rice, doing its work imperfectly, but also because the rice grown was not the best variety for table use or suitable for the home market. So the industry, so far as the manufacture was concerned, was allowed to lapse. The farmers since then have still kept on planting the rice, which they have cut and used for fodder for their horses and stock, using the seed saved from the crop reaped for re-sowing the land. The consequence has naturally been that the crop had deteriorated with successive plantings, through the same seed being used without change. But three things of great importance had been learned. These were: 1st. The suitability of the soil and climate of the Logan district for rice culture. 2nd. The proper time at which to sow the seed to ensure success. 3rd. The best system of planting and after-treatment of the crop. The value of rice has also been thoroughly tested as green feed for horses and stock, who eat it greedily and keep in splendid condition when fed upon it. The greatest difficulty in rice culture has been found in procuring the right seed, there being such a large variety of each kind, both with their distinctive flavour, colour, and quality, as well as in the facility with which the crop can be handled and harvested (as I will explain further on) and in the requirements of the merchant, who has his prejudices in favour of certain kinds, which more or less best suit the tastes of the consumer. This has now to a certain extent been overcome, and our farmers are now prepared to carry out this important branch of agricultural industry on sound business lines and with up-to-date methods.

### PREPARING THE LAND.

Rice, like every other cereal and vegetable, to ensure good results, must have a certain amount of attention and care in preparing the land, although the question of drainage does not enter so largely into consideration as regards rice as with other cereals, and it, of course, greatly depends as to which variety of rice you intend to cultivate, but stagnant water should be avoided as detrimental. The variety I intend this article to illustrate is the Aus, or upland rice. I have tried the Aman variety as an experiment, but with small success, the chief fault of the latter being the necessity of it being submerged continuously with not less than 2 to 3 inches of water, and when the crop ripens, the difficulty of harvesting, owing to the grain being so brittle that at the least touch it leaves the ear with a consequent loss of seed. The variety of rice now grown most extensively in the Logan district is known as the "White Java," which gives a length of straw from 4 to 6 ft., with a good flag, besides a grain of good length, fairly plump, and good cropper, and, so

far, seems fairly free from disease or rust. Other varieties now being tried are the China, Kobe Japan, Batavia River, and Italian Upland, of which the White Java and the Italian Upland have been obtained through the medium of the Agricultural Department.

In preparing the land for planting, ordinary methods need only be adopted—that is, to first plough, leaving the soil to lie for a week or so, to aerate and sweeten; then crossplough and harrow, bringing the soil to as fine a tilth as possible. The best time in this district for planting (and I should think it a suitable time for all districts south of Rockhampton) is at the end of September or at the beginning of October, when we get the first rains. In cultivating for rice on hillsides or sloping land with a natural rapid drainage, it would be advantageous to slightly terrace the land crossways to the fall of the hill, leaving an open catchment drain on the higher side, blocked at each end to conserve the rain water, because even so-called upland rice must have a certain amount of moisture, and by the construction of the above drain, or dam so to speak, the gradual percolation of the conserved water will have the desired effect of helping to supply the necessary moisture, which would be about 20 to 30 in. of rainfall spread over the period of growth. This rainfall has produced very good crops of fair yielding grain.

## SOWING THE SEED.

In sowing the seed we have to be determined as to our requirements —if for cropping for grain or for fodder purposes only. There are three systems: Broadcast chiefly for fodder purposes, planting in drills, and transplanting from nursery beds. In the first instance—*i.e.*, sowing broadcast—it will take a bushel (60 lb. of paddy)* to the acre, the seed being harrowed and treated in the same manner as oats or wheat in the after cultivation. But the plan most generally adopted, and by far the best, is planting the rice in drills 2 ft. 6 in. or 3 ft. apart, and about 10 to 12 in. between the plants, which may be done successfully with an automatic seeder. By this method, about 35 to 40 lb. seed to the acre are required. It ensures the crop being more even and not so patchy as when sown broadcast, and allows a better chance of going through the crop with hoe or cultivator to remove any weeds that may have made their appearance before the rice has got fairly started. The system of planting in nursery beds and transplanting out is adopted chiefly in planting swamp rice or the Aman variety; but, as this system of planting entails a lot of labour, I do not think it will ever come into active operation in this State. The mode of operations with this variety is briefly as follows:—Beds are prepared according to the area to be planted; a bed about 20 ft. long and 6 ft. wide will be amply large enough to grow plants for a quarter of an acre, the beds being well made and enriched, so as to produce vigorous plants. Sow the seed and rake in carefully, watering at certain intervals. Care must be taken to keep the plants growing. When the plants are about 6 in. high they are ready for transplanting to their permanent beds, which is done by making holes about 10 in. to 1 ft. apart in the rows and 2 ft. 6 in. between the

* Unhusked rice seed.

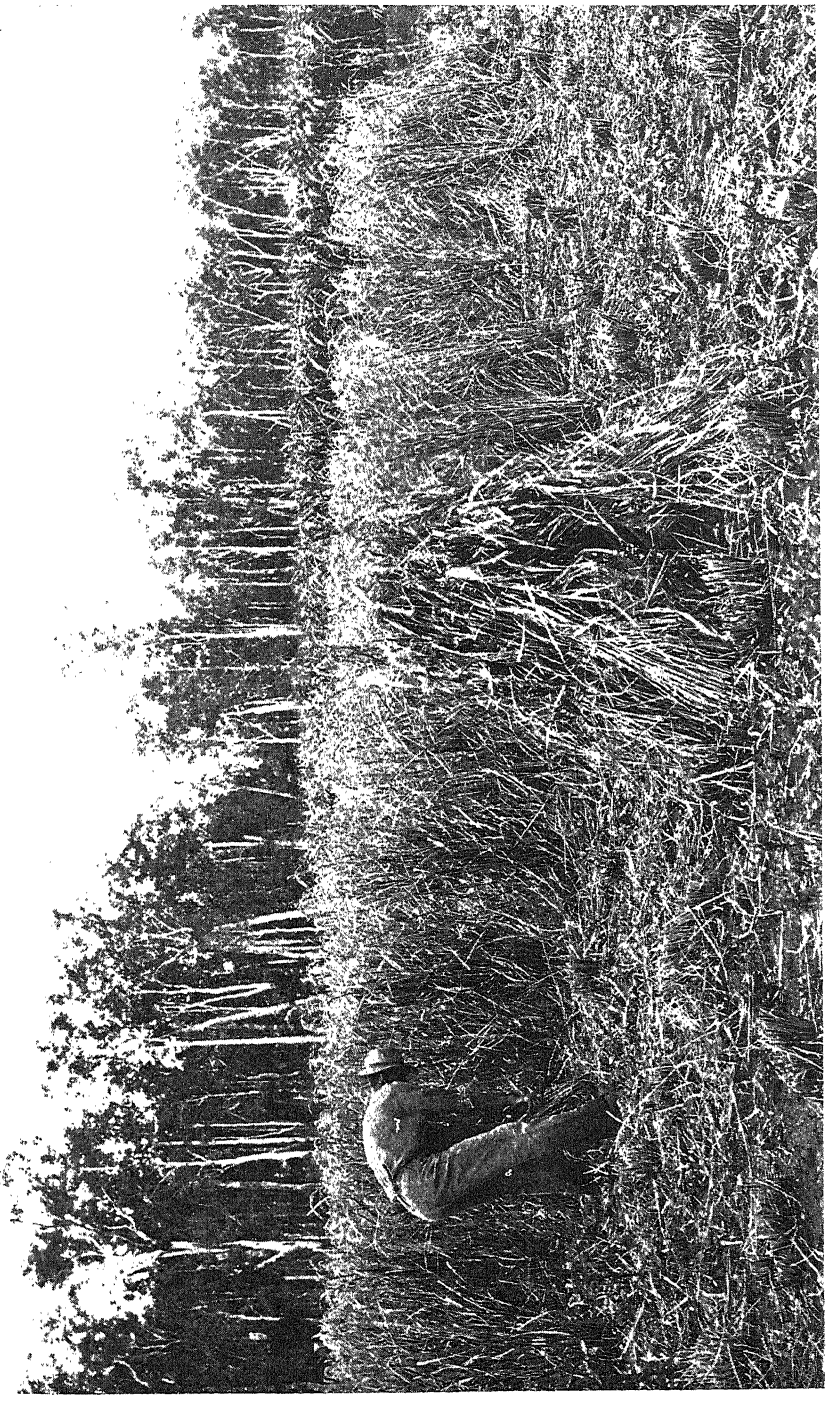


PLATE 35.—HARVESTING RICE.

rows. But, as before pointed out, this is a most tedious and costly mode of planting, and the labour involved is a serious item for consideration. You might as well try to transplant a field of oats or wheat, and expect to get a profit. So that it will be easily seen the planting in drills is at once the most economical and systematic, besides being the one most generally adopted.

### HARVESTING THE CROP.

This was a difficult matter to undertake with the rice formerly planted in the Logan district, the China and some of the Japan varieties being so brittle that when ripe the least touch caused the grains to drop off with a consequent loss of seed. This has been happily overcome to a certain extent by the better variety planted. Not only does the White Java give better facility for harvesting, but the straw is of a better colour and quality, of a good length, averaging from 4 ft. to 5ft., and in good land even 6 ft. is no unusual length; and no more fairer or gratifying sight to the farmer's eyes can be imagined than the rich appearance of a rice field ready for harvesting: this is whilst the stalks have still a bronze-green appearance, the heads have turned a golden brown, about half-way down, and appear what a wheat farmer or an inexperienced person would deem three-parts ripe. The heads of rice, heavy with grain, have a graceful, drooping appearance; as many as thirty to forty heads have been produced from a single grain planted—the product weighing from 10 oz. to 14 oz. By cutting some varieties of rice in this state, the loss is not so great as with over-ripe grain. The cutting is begun in the morning as soon as the dew is off, the rice being bound up into very small bundles, ready to be threshed as soon as possible (which will be explained later on). Rice is never left stooked in the field, but is treated as quickly as possible.

The usual method pursued in harvesting is to cut with the ordinary sickle or reaping-hook, although where large areas are now being planted it is thought that the latest inventions of wheat-harvesting machinery could be used most effectively. A slight alteration in the reaper and binder might be required in the way of lighter and broader wheels on the rich soft rice lands, but otherwise I see no difficulty in harvesting. At all events, it is the intention of the writer to induce some firm to make a trial at next harvesting as an experiment, and if successful a machine will doubtless be obtained on co-operative lines for the use of the district. After cutting with the sickle, the rice is gathered into bundles and carted into the barn or shed, or, if not sufficiently dry, is left for a day or so to ripen; but this is not often the case, experience having taught our farmers the right time to cut, and it is generally taken to the barn at once for stripping or threshing.

### THRESHING THE RICE.

Where there are large quantities, this can be done with the ordinary flail on a threshing-floor, but other system are in vogue where only small quantities are grown. One plan of threshing is by driving four forks into the ground, about 4 or 5 ft. apart in width and 10 or 12 ft. long, placing two long saplings lengthways and two crossways. Over these a

sheet or tarpaulin is placed to hang and form a sort of long trough. In the centre, resting on the cross pieces, a rough kind of ladder is placed, and the bundles of rice are then beaten over the bars of the ladder, which causes the grain to drop into the bag. Some farmers merely nail a few strips across a box or wooden trough, and beat the rice out on this by handfuls. After the grain is beaten from the straw (it is then known as paddy), the next operation is the winnowing. This is done in an ordinary sieve by letting the grain fall on to a sheet in a light breeze, the sieve being held up at a little distance; its weight causes the sound grain to fall on the sheet, whilst the light grain, bits of straw, &c., are wafted away to one side. The paddy is then carefully collected and placed in the sun, spread out for a few days to get thoroughly dry, when it is bagged and stowed away in a dry barn, or else taken away to the miller for turning into the article of trade and commerce with which we are more familiar, and known as rice and not paddy. The straw, after the grain is threshed out, is spread out to dry or cure, or else it is fed to the stock. A great deal of nutriment remains in the stalk at the time of threshing, and I believe it would make up into a splendid ensilage if desired to be used when other feed is scarce. I should be pleased to hear the results if any of our enterprising farmers will give it a trial.

### MILLING THE RICE AND PREPARING THE CROP FOR MARKET.

This is a most interesting operation, and for the want of the necessary machinery the rice industry has lain dormant for several years in the Logan district. Every credit must be given to Mr. F. W. Peek (the writer of this article) for the energy and enthusiasm he has displayed in reorganising the industry, and the farmers, through the medium of the Logan Farming and Industrial Association, who took the matter up, believing that a great benefit would result to the district if only carried out in a systematic manner. The matter was ably discussed at their meetings. The Agricultural Department was written to for advice, and their assistance was given as far as possible to facilitate the objects sought to be obtained. It was from information supplied by the Department that the farmers were induced to co-operate in the purchase of a new and better variety of seed, a quantity of White Java—900 lb.—being purchased and distributed at first cost among the farmers; next, a small experimental patch was started, the Department supplying rice seed of other varieties, which are now being tested for their producing and milling qualities, the seeds from this source being again redistributed free of charge to those willing to grow them and still further test the various kinds submitted.

With the large increase of area planted, the want of a mill began to make itself felt. The prices offered for Queensland-grown rice were very low, principally owing to no local mills in Southern Queensland being established at that time. Again, the Department of Agriculture was appealed to, and the address was obtained of the latest up-to-date firm of manufacturers of rice-milling machinery. This was the Engleburg Huller Co., of Syracuse, U.S.A., who were promptly written to for information, and price-lists and catalogues were received from them. A

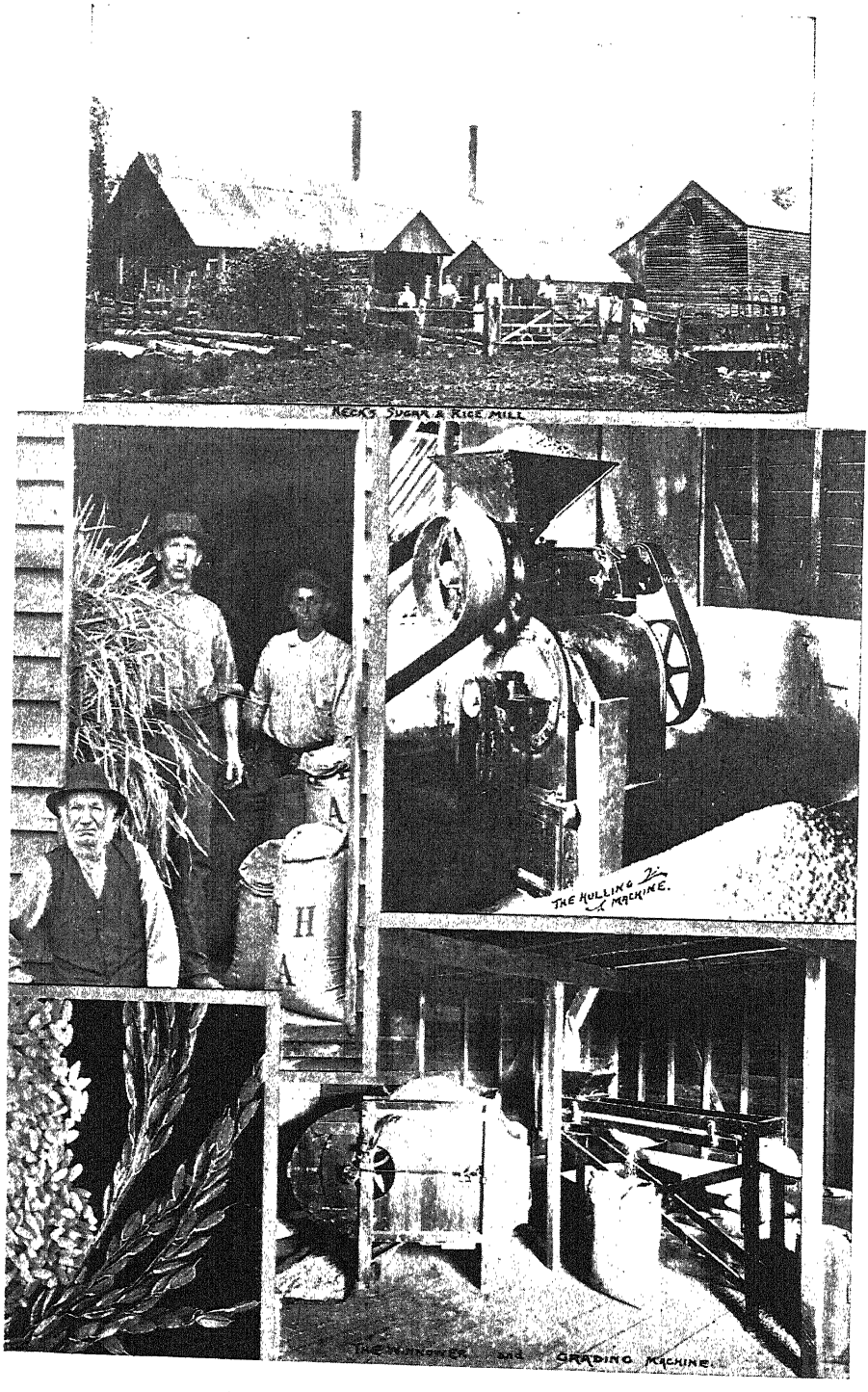



PLATE 36.—RICE MILL, PIMPAMA ISLAND.

meeting of the farmers was called, and an endeavour was made to get a co-operative mill, but without success, the general opinion being that growing and manufacture were two different branches of the business, and that milling would be better undertaken by a local sugar-miller, who would have the necessary engine-power to work the rice-mill at times when the sugar season was over. This was eventually the plan adopted. Mr. Wm. Heck, who owned a sugar-mill on Pimpama Island, sent for and erected the necessary buildings and machinery as an adjunct to the sugar-milling industry. A neat weatherboard structure, the dimensions being 28 ft. long, 18 ft. wide, and 22 ft. high (two story), was erected on stumps to keep the floors dry—an essential in ricemilling operations—a floor being placed about 10 ft. high from the basement floor and extending the full length of the building. Upon this floor is erected the Engleburg Huller and Polisher, a neat little machine known as the "No. 4 size," and capable of treating half-a-ton of dressed rice per day. The paddy, being run into the hopper of the machine, falls on to a cylinder which revolves at high speed and most effectually "hulls"—that is, rubs off the cuticle or outer skin—and polishes the grain in one operation. The pollard or residuum from the rice (hulling and polishing) falls on the floor, whilst the grain itself descends to the lower or basement story of the building by means of a shoot which conducts it into a machine placed to receive it, and known as a grader, which is worked and fed automatically from the machine above. There are four sieves or sifters in this grading machine which separate the broken grains, and also the polished rice into first, second, and third quality, the rice being caught in bags or boxes placed to receive it. It is then ordinarily ready for market, but Mr. Heck added another machine to his mill, known as an improved winnowing machine; this machine, by a series of cogs and cranks, makes the rice pass through another set of sieves, and, at the same time, the wind from a rotary fan contained in the machine and driven at a high velocity clears off any impurities of husk, dust, &c., that may be with the rice after leaving the grading machine, and completes the milling operations by finishing the product in a perfectly clean and highly polished state. Samples of this rice were exhibited at the last National Agricultural Society's Show in Brisbane, and submitted to experts, who expressed themselves as pleased at the improved samples displayed, which were equal to any imported rice of the same variety and very little different from the best Japan.

### THE RICE CROP—WILL IT PAY?

This is the question invariably put to the writer whenever advocating the growing of rice as one of the crops to be successfully undertaken in the coastal districts of this State.

In the first place, take the cropping. In ordinary situations, with only fair cultivation, from 30 to 40 bushels of 60 lb. of paddy can be obtained per acre, which is double the wheat yield, the average crop of wheat being from 15 to 20 bushels per acre. I know in some instances these quantities have been exceeded in both crops, but I give a fair average for comparison. The value of wheat per bushel ranges from

3s. to 3s. 6d., whilst the value of rice sold to the local mill averages from 4s. to 5s. per bushel delivered at the mills. Then dry rice chaff is of great value as a feed for stock and horses, and I feel sure, if placed on the market and once fairly tested, it would command a ready sale. The straw is less hard, and, when well dried, compares favourably with oaten straw, and a fairly low estimate would give (according to variety grown) from 3 to 4 tons per acre, of an estimated value of £2 to £3 per ton, or an average to the grower per acre of straw and grain of £15 10s. per six months' crop. Of course, in favoured districts two crops can be obtained in the year—that is, where frosts do not appear. Then the above figures would have to be doubled as a yearly income, but, in the Logan district, only one crop of rice is taken, to be followed by a late crop of some other kind, such as oats, &c. Of course, the greatest benefit is derived by the grower on a large scale if he does his own milling. A glance at the prices paid for paddy and the prices now obtainable for the finished product will be worth consideration. Taking the current prices of rice, at the time of writing, in the Brisbane market, duty paid, best Japan is £24* per ton. The commonest quality of imported rice, "Rangoon," fetches, duty paid, £19. This price gives a fair margin of profit to the local miller if he sells at £18 per ton. The samples being milled this season at the Pimpama Island mill are of very high grade, and closely resemble "Patna" in shape of grain, but slightly darker in colour. Taking then the local rice at £18* per ton market value, to produce which 1 ton 10 cwt. of paddy would be required (according to records taken at recent trials) to be milled, of a value of £12 9s. 9d.; this would leave a margin of £5 10s. 3d. I will add here that paddy rice is bought locally like wheat at 2,240 lb. per ton, deducting the cost of milling, the average of about £2 per ton leaves the miller a net profit of £3 10s. 3d. per ton. To this must be added the value of the pollard, which also is of great value as feed for calves, pigs, or poultry, when steamed and then mixed with separator milk. Its commercial value is certainly not less than £2 to £3 per ton.

The following is taken from the Brisbane "Observer" of 29th June, 1901:—

"We were to-day shown a sample of rice grown at Pimpama Island, Moreton Bay. It resembles Patna rice in shape of grain, but is darker in colour. Qualified experts who have seen the sample say that it is the first really high-grade rice that they have seen grown in this State, and as it can be marketed at from £18 to £18 10s., should command a ready sale. The commonest quality of imported rice, Rangoon, fetches £19, duty paid, here just now, while for Japan rice £24, duty paid, is asked by the distributing houses."

The price quoted for the mill such as I have described, and which is so constructed that it can be duplicated or extended at a very small cost is, for the No. 4 machine, with a capacity of not less than half-a-ton per day, together with grader, &c., about £130, delivered at Brisbane. Of

* £29 to £30 in July, 1917. The figures as here given by Mr. Peek were those ruling in 1901.—ED.

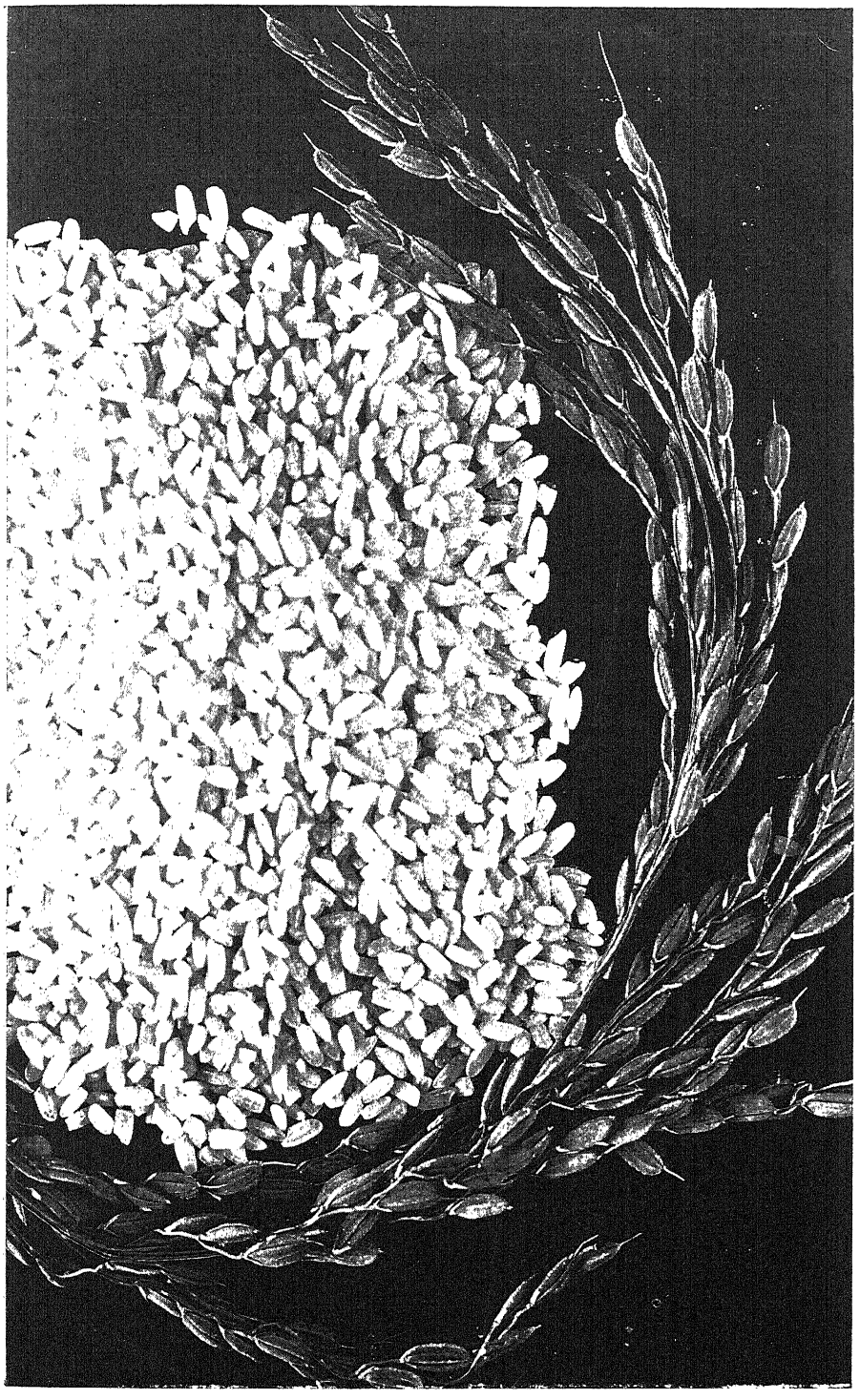


PLATE 37.—HEAD OF RICE AND HULLED RICE. (Natural Size.)

course, the buildings are extra, and the power required to drive the machinery: but worked in conjunction with any existing sugar-mill, or sawmill, &c., it would prove of great value to the district, and a source of profit on the outlay to any enterprising millowner.

## FUTURE PROSPECTS OF THE RICE INDUSTRY.

Like all other crops, rice has its enemies and diseases; it has a kind of rust, smut, &c., and in some parts of Queensland grubs will take the roots, but up to the present the grub has not caused any trouble in the Logan district. The rust has yet to be dealt with, and I think this will be accomplished by experimenting with various kinds of rice seed till we meet with a rust-resisting variety. It is probable now that under Federation the importance of rice culture will receive the attention it is worth. A large sum of money is annually expended in importing the product into the Commonwealth States, I would therefore advise all farmers to give rice a fair trial, especially as we are growing varieties that can now be classed as fairly successful on our coast lands, and where a fair average rainfall can be partly depended upon. The value of rice grown simply as fodder to cut green is great for stock feed, the stalks being sweet, juicy, and succulent, and giving a good return per acre, and all stock will eat it with avidity. The question of labour does not enter largely into rice cultivation: as I have pointed out, although a tropical product, there is every facility for cultivation by present mechanical methods—that is as far as the Aus or upland rice is concerned; the Aman or Boro varieties being swamp rices needing irrigation I have not yet heard of as being grown to any great extent, and they probably will not be for some time, if at all, owing chiefly to the heavy outlay required for a suitable water supply and an irrigation plant, which can be dispensed with in growing the beforementioned varieties of upland rice, which have proved most suitable for existing conditions and our present agricultural methods of cultivation and harvesting. Of this I am certain, that the rice is one of our coming crops which, together with coffee, will prove of great benefit to this State particularly, and a further source of wealth to our producers. The market for rice in Australia is a growing one, and it will take years before the supply overtakes the demand. Our farmers need not fear to grow the crop and invest in this industry, which will return a fair amount of profit for the labour and outlay required to produce an article which only requires care in selecting and planting the varieties to suit the market requirements. I am sure the efforts of our producers will be crowned with success, and I shall be pleased with the part I have taken in assisting the modern development of rice cultivation in Queensland.

REGISTRAR-GENERAL'S STATISTICS OF RICE PRODUCTION AND IMPORTATIONS FOR THE YEAR 1899.

| | |
|---|---|
| Total area planted in Queensland .. .. | 319 acres |
| „ quantity produced (paddy) .. .. | 9,275 bushels |
| „ average would equal clean rice .. | 320,617 lb. |
| The net imports of rice for 1899 were .. | 9,283,933 lb. |
| Of the value of .. .. .. .. | £50,099 |

The above figures represent the position as to production and consumption, and would therefore be about 3·34 per cent. of the total requirements of this State only.

RECORD OF RICE CROPS FROM 1898 TO 1916.

| Year. | Acres. | Yield. Bushels. | Average per Acre. Bushels. |
|---|---|---|---|
| 1898 .. .. | 863 .. | 38,133 .. | 44·19 |
| 1899 .. .. | 319 .. | 9,275 .. | 20·03 |
| 1900 .. .. | 271 .. | 6,870 .. | 25·35 |
| 1901 .. .. | 205 .. | 5,222 .. | 25·47 |
| 1902 .. .. | 38 .. | 1,093 .. | 28·76 |
| (Average.—Cairns, 30·16; Cook, 31·50; Port Douglas, 33·84) | | | |
| 1903 .. .. | 49 .. | 1,322 .. | 27 |
| 1904 .. .. | 60 .. | 1,638 .. | 27·30 |
| 1905 .. .. | 33 .. | 885 .. | 26·82 |
| 1906 .. .. | 24 .. | 772 .. | 32·17 |
| 1907 .. .. | 14 .. | 763 .. | 24·50 |
| 1908 .. .. | 7 .. | 270 .. | 38·57 |
| 1909 .. .. | — .. | — .. | — |
| 1910 .. .. | 2 .. | 22 .. | 11 |
| 1911 .. .. | 15 .. | 402 .. | 26·80 |
| 1912 .. .. | 1 .. | 27 .. | 27 |
| 1913 .. .. | 5 .. | 118 .. | 23·60 |
| 1914 .. .. | 3 .. | 66 .. | 22 |
| 1915 .. .. | 1 .. | 23 .. | 23 |
| 1916 No rice planted. | | | |

The return for eighteen years amounted to 66,901 bushels, or 3,716 bushels per annum of Paddy (60 lb. per bushel), or about 95 tons, which, at £24 per ton, is £2,280. Yet the net imports of rice in one year alone were to the value of £50,099.

[The total annual production of rice in the United States of America, which, in 1866, was 2,000,000 lb., has now reached 350,000,000 lb. It will take 8,000 large railway cars to handle the crop this season. Rice lands have risen from £2 per acre to £8 per acre; hundreds of miles of irrigation canals have been constructed. Rice has been the redemption of the prairie lands of Texas and Louisiana. In ten years the worthless lands of these two States will produce the world's demand in rice. An acre there produces 20 sacks, worth from 10s. to 16s. per sack. Where are the Queensland farmers in the race?—Ed. " Q.A.J."]

# Pastoral.

## ERADICATION OF THE CATTLE TICK.

### OBSERVATIONS ON THE EFFICACY OF THE TICK-DESTROYING MIXTURES APPROVED BY THE QUEENSLAND STOCK DEPARTMENT, ACCORDING TO THE METHOD AND THE THOROUGHNESS OF THEIR APPLICATION.

The Queensland Cattle Tick (*Rhipicephalus annulatus Australis*) is a one-host tick—viz., it spends the whole of its parasitic life, approximately twenty-one days, on one animal. Its life-history, according to Tryon, is briefly as follows:—

The large fully distended ticks, so easily seen on badly infested animals, are the female ticks that have completed their twenty-one days of parasitic life. They are engorged with blood and about to leave their host and fall to the ground. On dropping on the ground, these fully-developed ticks seek a sheltered spot, and will, under favourable weather conditions, commence to lay eggs in three days. This operation is completed in from ten to twenty-one days, and the number of eggs deposited varies from 1,500 to 3,000. Under favourable conditions as to temperature and moisture, such as usually obtain in the coastal areas of Queensland, the eggs hatch in from twenty-one to forty-two days, and each egg gives birth to a very small young tick, or larva as it is called. The larva is much smaller than a pin's head, is light-brown in colour, and has six legs. It crawls up such things as blades of grass, twigs of trees, posts of fences, &c., and can live there some months, but without a host it is unable to develop any further and will ultimately die. Should, however, a cow or other bovine happen to rub against the grass, twig, or post carrying the larval ticks, the latter will attach themselves to some part of the body of the animal, pierce the skin, and commence to feed on its blood. About seven days after the tick, as a larva, obtains access to and attaches itself to a cow it moults and develops into the second stage. It is then called a nymph, and has eight legs. After a further seven days as a nymph it again moults and reaches the adult stage, the male and female then being about the same size. Only seven more days are passed on the cow, and during this time the female ticks gradually increase in size, and for about twenty-four hours before leaving the host they engorge themselves enormously with blood, then drop to the ground, and seek a suitable sheltered spot in which to lay eggs.

If only a small number of larval ticks (say only ten) attach themselves to a cow, it will be very difficult, or in many cases impossible, to detect their presence at this stage, even though a most careful examination be made with the aid of a tooth-comb and magnifying lens. However, the importance and the danger of such a light and unobserved

tick infestation must not be overlooked, as if the infested cow is not immune she will will probably die of redwater before the ticks are sufficiently grown to be readily detected. On the other hand, if the cow should be immune from redwater she might be sold, and if not treated or only imperfectly treated with tick-destroying fluid the purchaser might travel her a long distance by rail, and so carry ticks into clean country. If only five fully engorged female ticks developed from the ten larval ticks, and these on leaving their host found a suitable nesting-place, and the conditions were favourable for hatching, they might account for the distribution of some 10,000 to 15,000 larval ticks capable of setting up redwater amongst other members of the herd into which the cow was introduced, and, in addition, set up a new centre of tick infestation.

By thoroughly treating tick-infested cattle with dipping fluids containing ·2 per cent. of arsenic (8 lb. of arsenic per 400 gallons of water containing emulsifying agents), it is possible to either completely destroy or prevent the further propagation of the ticks. To get the best results from this treatment, cattle should be forced to plunge into and swim through a dipping tank so that the whole body is completely immersed in the tick-destroying fluid.

Dipping in a ·2 per cent. solution of arsenic, in which some soap has been dissolved to render the mixture more adhesive, has now been practised in Queensland for about twenty years, and when properly carried out the results have been highly successful. It has been abundantly proved that the most grossly tick-infested cattle can be completely cleansed of ticks by two dippings in such a fluid carried out with an interval of seven days between such dippings, and if the cattle thus treated are not exposed to reinfection they may be safely travelled into clean country. Of late years there has been a tendency amongst cattlemen to over-estimate the tick-destroying effects of arsenical solutions, and many wrongly claim that a solution of arsenic in the proportion of 7 lb. to 400 gallons of water, and even that 6 lb. of arsenic to 400 gallons of water will effectively destroy all ticks at one dipping, while a few stockowners show keen disappointment when they are informed that their dips so charged cannot be accepted as efficient for the dipping of cattle travelling into clean country.

Again, others wrongly claim that, using a similar solution, careful application by spraying is as effectual as by dipping.

A third common error is to neglect having dip samples analysed and to rely on the following very unreliable method of testing the strength of the dipping fluid:—Immediately after dipping remove from the cattle three of four ticks and place them in an empty box or bottle. If the ticks die in from one to two days the dip is too strong; if the ticks take from three to five days to die, the dip is of correct strength; if they are not dead within five days the dip is too weak.

With the object of correcting these errors and showing the absolute necessity for the most careful preparation of dipping fluids in accordance with the Government formula and of the thorough application of

same by dipping, we will give a brief description of the work of eradicating ticks at the Stock Experiment Station, Townsville:—

A spraying crush was erected with an overhead tank. The fluid used was prepared from an approved commercial dipping concentrate in accordance with the instructions on the label. All the animals were carefully sprayed, such portions of the body as the inside of the ears, the brush, under the arms and flanks receiving special attention, and the operation was not hurried. Seven days after spraying the same cattle were yarded, and examination revealed the presence of live ticks, including many fully engorged female ticks. They were then sprayed a second time with the same fluid and inspected after a further period of seven days, when live and fully engorged female ticks were again discovered on them. The dipping fluid used in the first two trials was discarded and a fresh fluid prepared strictly in accordance with the Department's formula was tried. The cattle received their third spraying with this material, but on examination seven days later we again found them to be infested with a few fully engorged female ticks. Other concentrates were then used with equally unsatisfactory results. From this period onwards spraying was repeated at fourteen-day intervals, and for some months afterwards a few adult female ticks were discovered when the cattle were inspected immediately before being sprayed. After five months of such treatment, aided by burning of the pasture, ticks were seldom seen; and, although spraying was continued at fourteen-day intervals, no ticks might be observed on the cattle for a month or two. Still, on rare occasions, when examining an animal before spraying, one would find a few adult ticks. Some of these were doubtless the result of accidental reinfestation, seeing that the property on one boundary is only separated from adjoining tick-infested land by a single line of fencing.

The following experiment will illustrate the usual result experienced by us from spraying tick-infested cattle:—

Three stud bulls from Warwick, in South Queensland, arrived at the Townsville Experiment Station on 20th April, 1916. On 1st May one bull was found to be tick-infested, consequently all three bulls were immediately sprayed. The fluid used in the spray contained arsenic in the proportion of 8·7 lb. to 400 gallons of water, with a very high wetting power. On 2nd May some fully engorged female ticks were removed from the infested bull; several duly laid eggs, which failed to hatch. On 3rd May other fully engorged female ticks were removed, several of which laid eggs, and these hatched on 28th June.

After twelve months of this experience the conclusion was drawn that spraying of cattle occupied too much time and was not sufficiently reliable to enable us to maintain the property absolutely clean; consequently, a dipping-tank was installed. The dip was charged with fluid prepared in accordance with the Department's formula, as follows:—

| | |
|---|---|
| Commercial arsenic .. .. .. .. .. | 8½ lb. |
| Caustic soda .. .. .. .. .. .. | 4 lb. |
| Tallow .. .. .. .. .. .. .. | 4 lb. |
| Stockholm tar .. .. .. .. .. .. | ½ gallon. |
| Water .. .. .. .. .. .. .. | 400 gallons. |

The dipping-vat at working level holds 2,800 gallons, and it was charged in the following manner:—

Two thousand gallons of water were run into the dip; 59½ lb. of commercial arsenic were mixed with 14 lb. of caustic soda in the dry state and placed in a 400-gallon tank with about 20 gallons of water, the mixture being stirred for a few minutes until the ingredients boiled and the arsenic dissolved. Cold water was then added until the tank was full, when the mixture was well stirred and run into the dip. Next, 50 gallons of water were run into the tank and heated to boiling point; 14 lb. of caustic soda and 28 lb. of tallow were then added and boiled together for three-quarters of an hour. After this, cold water was gradually added, heating was continued, but the fluid kept below boiling point. When the tank was half-full, 3½ gallons of Stockholm tar were added and the mixture well stirred. Heating was continued and water gradually added until the tank was full, when the mixture was thoroughly stirred and run into the dip. The whole of the dip contents were then thoroughly stirred and used for dipping cattle.

Since the dip was charged all cattle running in the paddocks have been dipped every fourteen days, with highly satisfactory results. This operation will, although the property is now clean, be continued every fourteen days indefinitely, since the work is easily and expeditiously performed and causes no discomfort to the animals treated, either in summer or winter, while it prevents any reinfestations of the pastures that might result if any cattle picked up larval ticks near the boundary fences.

The following experiment illustrates our experience of the tick-destroying effect of the departmental mixture when applied by totally immersing the cattle in a dipping tank:—

Three steers, heavily infested with ticks of all ages, were purchased for experimental purposes, and on the 16th April, 1917, they were dipped in a fluid containing 8·6 lb. of active arsenic to 400 gallons of fluid of a high wetting power. After dipping they were immediately placed in clean stalls and kept under careful observation for several weeks. On the first, second, third, and fourth days following dipping, careful inspection showed that considerable numbers of adult female ticks were becoming fully engorged and dropping to the ground in the usual manner. Many such ticks when fully engorged and about to drop were removed and kept under careful observation, with the results detailed in the table below. On the fifth day following dipping no live ticks were found on any of the animals, and although they were kept under careful observation for several weeks no more ticks were found on them.

Of the fully engorged female ticks removed, no less than seventy-three laid eggs which varied in quantity from very few up to a full complement. However, no eggs hatched.

## TABLE SHOWING THE EFFECTS OF DIPPING ON THE MORE RESISTANT ADULT TICKS.

**Experiment No. 1.**—On 16-4-17 sixty live ticks were removed from three steers immediately after dipping and were kept under favourable conditions as to temperature and moisture.

| Date. | Day of Experiment. | No. of Ticks Dead. | Total No. of Ticks Alive. | No. of Ticks Laying Eggs. | Eggs Hatched. | Temperature. |
|---|---|---|---|---|---|---|
| 16-4-17 | ... | ... | 60 | ... | ... | Room |
| 19-4-17 | 3 | 7 | 53 | ... | ... | ,, |
| 23-4-17 | 7 | ... | 53 | 1 | ... | ,, |
| 24-4-17 | 10 | 49 | 4 | 1 | ... | ,, |
| 6-5-17 | 20 | 3 | 1 | 1 | | ,, |
| 12-9-17 | ... | ... | ... | ... | Nil | ,, |
| ... | ... | ... | ... | . | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | .. | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | .. | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |

**Experiment No. 2.**—On 17-4-17 eighty-nine live ticks were removed from three steers twenty-four hours after dipping and were kept under favourable conditions as to temperature and moisture.

| Date. | Day of Experiment. | No. of Ticks Dead. | Total No. of Ticks Alive. | No. of Ticks Laying Eggs. | Eggs Hatched. | Temperature. |
|---|---|---|---|---|---|---|
| 17-4-17 | .. | ... | 89 | ... | ... | Room |
| 19-4-17 | 2 | 1 | 88 | ... | .. | ,, |
| 23-4-17 | 6 | ... | 88 | 33 | ... | ,, |
| 24-4-17 | 7 | ... | 88 | 37 | ... | ,, |
| 26-4-17 | 9 | 16 | 72 | 46 | ... | ,, |
| 28-4-17 | 11 | .. | 72 | 47 | ... | ,, |
| 6-5-17 | 19 | 13 | 59 | 47 | ... | ,, |
| 15-5-17 | 28 | 12 | 47 | 47 | ... | ,, |
| 7-6-17 | 51 | ... | ... | ... | Nil | 37°C. |
| 15-6-17 | 59 | ... | .. | ... | ... | ... |
| 24-6-17 | 68 | ... | ... | ... | Nil | ... |
| 19-9-17 | ... | ... | ... | ... | Nil | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |

**Experiment No. 3.**—On 18-4-17 seventy-eight live ticks were removed from three steers forty-eight hours after dipping and were kept under favourable conditions as to temperature and moisture.

| Date. | Day of Experiment. | No. of Ticks Dead. | Total No. of Ticks Alive. | No. of Ticks Laying Eggs. | Eggs Hatched. | Temperature. |
|---|---|---|---|---|---|---|
| 18-4-17 | .. | .. | 78 | ... | ... | Room |
| 19-4-17 | 1 | 6 | 72 | . | ... | ,, |
| 23-4-17 | 5 | ... | 72 | 9 | .. | ,, |
| 26-4-17 | 8 | 29 | 43 | 18 | .. | ,, |
| 28-4-17 | 10 | ... | 43 | 19 | ... | ,, |
| 29-4-17 | 11 | 3 | 40 | 19 | ... | ,, |
| 4-5-17 | 16 | 13 | 27 | 19 | ... | ,, |
| 6-5-17 | 18 | 2 | 25 | 19 | ... | ,, |
| 12-5-17 | 24 | 6 | 19 | 19 | ... | ,, |
| 7-6-17 | 40 | ... | ... | ... | ... | 37°J. |
| 15-6-17 | 48 | ... | ... | .. | ... | ,, |
| 24-6-17 | 57 | ... | ... | ... | ... | ,, |
| 26-6-17 | 59 | ... | ... | ... | ... | Room |
| 19-9-17 | ... | ... | ... | ... | Nil | ,, |

**Experiment No. 4.**—On 19-4-17 thirty-eight live ticks were removed from three steers seventy-two hours after dipping and were kept under favourable conditions as to temperature and moisture.

| Date. | Day of Experiment. | No. of Ticks Dead. | Total No. of Ticks Alive. | No. of Ticks Laying Eggs | Eggs Hatched | Temperature. |
|---|---|---|---|---|---|---|
| 19-4-17 | .. | ... | 38 | .. | .. | Room |
| 26-4-17 | 7 | 20 | 18 | 3 | ... | ,, |
| 27-4-17 | 8 | ... | 18 | 4 | ... | ,, |
| 30-4-17 | 12 | 7 | 11 | 4 | ... | ,, |
| 4-5-17 | 16 | 3 | 8 | 4 | .. | ,, |
| 6-5-17 | 18 | 4 | 4 | 4 | ... | ,, |
| 19-9-17 | ... | ... | ... | ... | Nil | ... |
| . | ... | . | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |

**Experiment No. 5.**—On 20-4-17 sixteen live ticks were removed from three steers ninety-six hours after dipping and were kept under favourable conditions as to temperature and moisture. No further ticks available from steers on 21-4-17. Animals clean.

| Date. | Day of Experiment. | No. of Ticks Dead. | Total No. of Ticks Alive. | No. of Ticks Laying Eggs | Eggs Hatched. | Temperature. |
|---|---|---|---|---|---|---|
| 20-4-17 | .. | ... | 16 | ... | ... | Room |
| 26-4-17 | 6 | 8 | 8 | . | . | ,, |
| 1-5-17 | 11 | .. | 8 | 2 | ... | ,, |
| 4-5-17 | 14 | 1 | 7 | 2 | ... | ,, |
| 10-5-17 | 20 | 4 | 3 | 2 | ... | ,, |
| 11-5-17 | 21 | 1 | 2 | 2 | . | ,, |
| 19-9-17 | ... | ... | ... | ... | Nil | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |
| ... | .. | ... | ... | .. | ... | ... |
| ... | ... | ... | ... | ... | ... | ... |

## CONCLUSION.

There is a very striking difference in the efficacy of tick-destroying fluid according as this is applied by dipping or spraying. Spraying is so unreliable that its use for treating tick-infested or suspected cattle before travelling into clean country should not be countenanced when a suitable dip is available. If spraying is unavoidable, the cattle should be sprayed as often as necessary and held in a clean place until they are proved by the most careful inspection to be clean, and the inspector examining same should be sufficiently experienced to realise the great difficulty of detecting the presence of a very limited number of ticks, more especially when the hair is long.

F. THOMSON, Assistant Bacteriologist.
F. KEOGH, Chemist.
GEORGE TUCKER, Deputy Chief Inspector of Stock.

## BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

| Name of Owner. | Address. | Number of Males. | Number of Females. | Herd Book. |
|---|---|---|---|---|
| M. L. Cochrane .. | Paringa Farm, near Cairns | 5 | 21 | Ayrshire Herd Book of Australia |

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH SEPTEMBER TO 26TH OCTOBER, 1917.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Auntie's Lass ... | Ayrshire ... | 5 July, 1917 | 994 | 3·8 | 44·27 | |
| Sweet Meadows ... | Jersey ... | 8 Aug. ,, | 582 | 5·9 | 40·65 | |
| Netherton Belle ... | Ayrshire ... | 17 July ,, | 610 | 3·3 | 38·20 | |
| Twylish's Maid ... | Jersey ... | 26 Sept. ,, | 680 | 4·7 | 37·68 | |
| Hedge's Dutchmaid | Holstein ... | 9 Sept. ,, | 1,059 | 2·7 | 33·16 | |
| Prim ... ... | ,, ... | 3 Aug. ,, | 940 | 3 0 | 32·82 | |
| Netherhall Queen Kate | Ayrshire ... | 30 June ,, | 879 | 3 2 | 32·81 | |
| Lilia ... ... | ,, ... | 11 July ,, | 794 | 3·3 | 30·59 | |
| Nina ... ... | Shorthorn... | 6 Sept. ,, | 846 | 3·1 | 30·57 | |
| La Hurette Hope | Jersey ... | 22 Aug. ,, | 492 | 4·7 | 27·25 | |
| Miss Bell ... ... | ,, ... | 27 June ,, | 524 | 4·4 | 27·14 | |
| Confidence ... | Ayrshire ... | 25 June ,, | 633 | 3·7 | 27·0 | |
| College Damsel ... | Holstein ... | 12 July ,, | 958 | 3·4 | 27·0 | |
| Lady Mitchell ... | ,, ... | 26 Sept. ,, | 683 | 3·5 | 26·11 | |
| Lady Dorset ... | Ayrshire ... | 14 Aug. ,, | 616 | 3·4 | 24·47 | |
| Lady Loch II. ... | ,, ... | 3 June ,, | 575 | 3 6 | 24·26 | |
| Thornton Fairetta | Jersey ... | 30 June ,, | 357 | 5·6 | 23·63 | |
| College Bluebell ... | ,, ... | 28 June ,, | 632 | 3·2 | 23·59 | |
| Princess Kate ... | Ayrshire ... | 28 June ,, | 568 | 3·4 | 22·56 | |
| Songstress ... ... | ,, .. | 1 Oct. ,, | 465 | 4·0 | 21·83 | |
| Buttercup .. ... | Shorthorn... | 2 June ,, | 599 | 3·0 | 20·91 | |
| Miss Betty ... | Jersey ... | 27 Mar. ,, | 410 | 4·3 | 20·74 | |
| Miss Security ... | ,, ... | 27 Mar. ,, | 453 | 3·8 | 20·17 | |

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, OCTOBER, 1917.

During the month broodiness has been very troublesome; in several cases as many as four birds from a pen were in the broody coops. Mr. E. A. Smith, unfortunately, had a casualty, and the dead bird has been replaced. The weather has been somewhat changeable, but on the whole the health of the birds is very satisfactory. Mr. J. M. Manson wins the monthly prize with his White Leghorns, the total being 161 eggs. As a matter of interest to poultry-breeders, the following details with regard to Mr. R. Burns's Black Orpingtons are given. "F" birds have laid as follows:—

| | Eggs. | | Eggs. |
|---|---|---|---|
| April 3 to April 16 inclusive | 14 | June 4 to June 5 inclusive.. | 2 |
| „ 18 „ „ 25 „ | 8 | „ 7 „ „ 12 „ .. | 6 |
| „ 27 „ May 2 inclusive .. | 6 | „ 14 „ Sept. 7 „ .. | 86 |
| May 4 „ „ 6 „ .. | 3 | Sept. 9 „ „ 14 „ .. | 6 |
| „ 8 „ „ 24 „ .. | 17 | „ 16 „ Oct. 25 „ .. | 40 |
| „ 26 „ June 2 „ .. | 8 | Oct. 27 „ „ 31 „ .. | 5 |

And still laying.

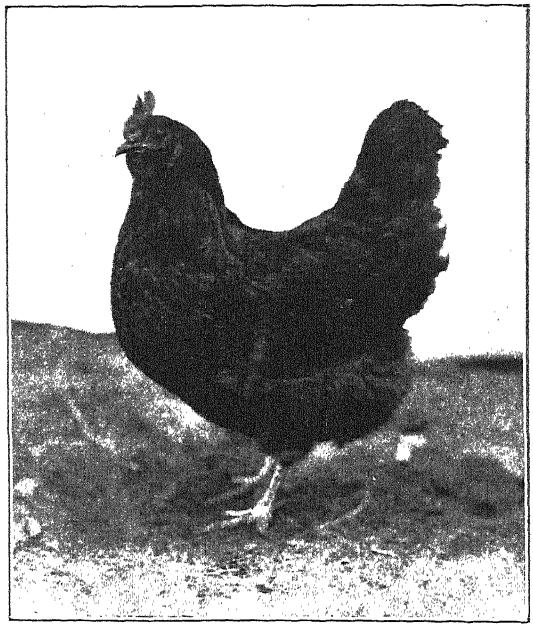


PLATE 38.—"F" BIRD.

The continuous laying of 86 eggs between 14th June and 7th September and the grand total of 201 eggs in 212 days, are both records. It is unfortunate that this bird's eggs are below the standard weight of 2 oz. In fact they average only 1¾ oz. In regard to this question of weights, the following table is of interest:—Mr. Burns's

"C" bird (total 158) and "E" bird (total 171) are full sisters to his "F" bird. The average weight of eggs for "C" bird is 2¼ oz. and for

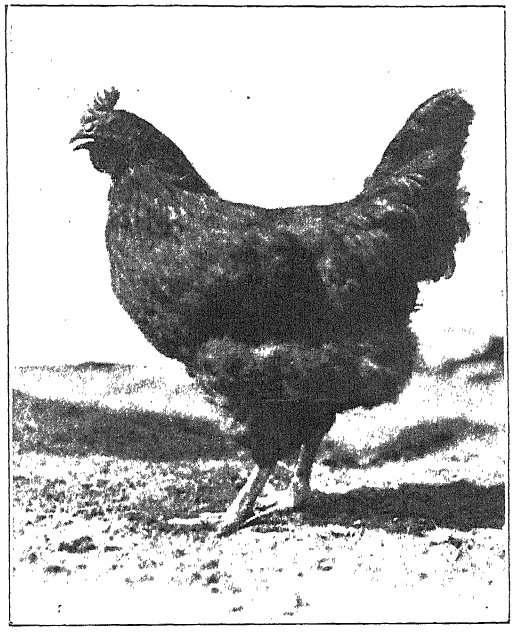


PLATE 39.—"E ' BIRD

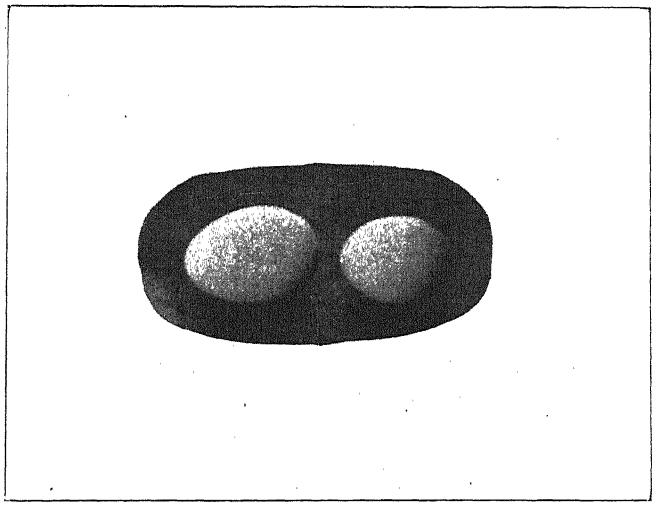


PLATE 40.—EGGS LAID BY "E" AND "F" BIRDS AT END OF OCTOBER. WEIGHT, 2⅜ OZ. AND 1¾ OZ., RESPECTIVELY.

"E" bird 2⅛ oz. Thus, in regard to the weight of egg material laid, these birds lie as follows:—

| Bird. | No. of Eggs. | Average Weight of Eggs. Oz. | Total Weight. Oz. |
|---|---|---|---|
| C .. | 158 .. | 2¼ .. | 355½ |
| E .. | 171 .. | 2⅛ .. | 363⅜ |
| F .. | 201 .. | 1¾ .. | 351¾ |

The record given above illustrates very forcibly the absurdity of merely buying eggs at a uniform price per dozen. Certainly a fairer

method would be to sell eggs by weight, and failing this the eggs should be graded. The following photographs show a parcel of ungraded eggs and then the same eggs separated into two grades. Unfortunately, the photograph does not show as much distinction as actually exists, but the smaller lot in the lower picture are distinctly smaller.

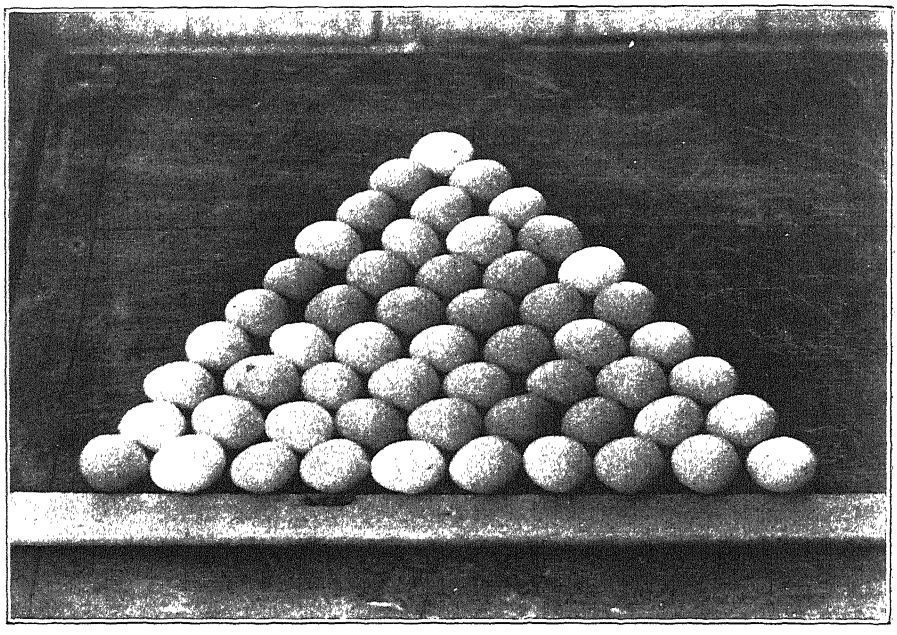


PLATE 41.—UNGRADED EGGS.

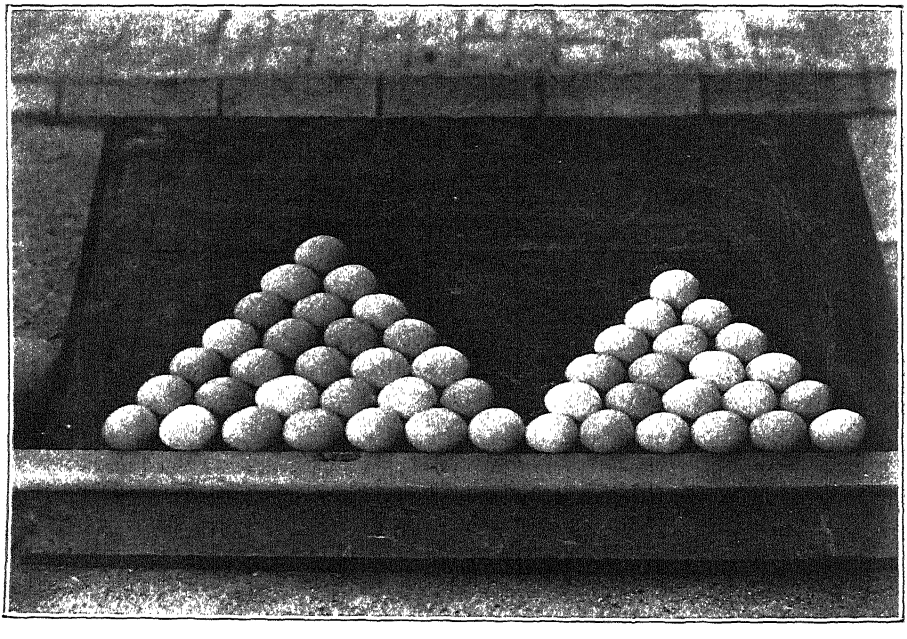


PLATE 42.—SAME EGGS SEPARATED INTO TWO GRADES.

## EGG-LAYING COMPETITION—*continued.*

| Competitors. | Breed. | October. | Total. |
|---|---|---|---|
| **LIGHT BREEDS.** | | | |
| E. Chester ... ... ... ... ... | White Leghorns ... | 155 | 947 |
| *G. H. Turner ... ... ... ... | Do. ... ... | 133 | 838 |
| G. Chester ... ... ... ... ... | Do. ... ... | 147 | 826 |
| W. Becker... ... ... ... ... | Do. ... ... | 139 | 815 |
| F. W. Leney ... ... ... ... | Do. ... ... | 140 | 814 |
| Chris. Porter ... ... ... ... | Do. ... .. | 141 | 812 |
| *J. M. Manson ... ... ... ... | Do. ... ... | 161 | 803 |
| W. R. Crust ... ... ... ... | Do. ... ... | 132 | 796 |
| Oakland Poultry Farm ... ... ... | Do. ... ... | 142 | 789 |
| T. A. Pettigrove. Victoria ... ... | Do. ... | 127 | 782 |
| Kelvin Poultry Farm ... ... ... | Do. ... ... | 149 | 768 |
| Moritz Bros., S.A. ... ... ... | Do. ... ... | 118 | 766 |
| T. Taylor ... ... ... ... ... | Do. ... ... | 140 | 761 |
| *J. Zahl ... ... ... ... ... | Do. ... ... | 135 | 758 |
| Quinn's Post Poultry Farm ... ... | Do. ... ... | 127 | 745 |
| *J. R. Wilson ... ... ... ... | Do. ... ... | 132 | 744 |
| *A. T. Coomber ... ... ... ... | Do. ... ... | 139 | 739 |
| A. Shillig ... ... ... ... ... | Do. ... ... | 136 | 735 |
| D. Fulton ... ... ... ... ... | Do. ... ... | 135 | 732 |
| J. G. Richter ... ... ... ... | Do. ... ... | 124 | 731 |
| *Mrs. J. R. D. Munro ... .. ... | Do. ... ... | 137 | 716 |
| T. B. Hawkins ... ... ... ... | Do. ... ... | 116 | 716 |
| A. H. Padman, S.A. ... ... ... | Do. ... ... | 131 | 710 |
| Mars Poultry Farm ... ... ... | Do. ... ... | 111 | 692 |
| *Dixie Egg Plant ... ... ... | Do. ... ... | 147 | 688 |
| *A. W. Bailey ... ... ... ... | Do. ... ... | 107 | 686 |
| C. Knoblauch ... ... ... ... | Do. ... ... | 98 | 679 |
| *T. Fanning ... ... ... ... | Do. ... ... | 143 | 679 |
| J. L. Newton ... ... ... ... | Do. ... ... | 141 | 672 |
| R. Holmes ... ... ... ... | Do. ... ... | 117 | 667 |
| F. Clayton ... ... ... ... ... | Do. ... ... | 128 | 663 |
| Mrs. W. D. Bradburne, N.S.W. ... | Do. ... ... | 126 | 656 |
| G. Howard ... ... ... ... | Do. ... ... | 131 | 653 |
| L. G. Innes ... ... ... ... | Do. ... ... | 129 | 651 |
| G. Williams ... ... ... ... | Do. ... ... | 116 | 640 |
| J. Holmes ... ... ... ... ... | Do. ... ... | 135 | 636 |
| E. Cross ... ... ... ... ... | Do. ... ... | 119 | 634 |
| Mrs. S. J. Sear ... ... ... ... | Do. ... ... | 139 | 633 |
| G. J. White ... ... ... ... | Do. ... ... | 134 | 633 |
| S. C. Chapman ... ... ... ... | Brown Leghorns... ... | 139 | 626 |
| *A. E. Walters ... ... ... ... | White Leghorns... ... | 120 | 616 |
| C. H. Singer ... ... ... ... | Do. ... ... | 136 | 611 |
| C. P. Buchanan ... ... ... ... | Do. ... ... | 137 | 608 |
| J. Ferguson ... ... ... ... | Do. ... ... | 130 | 600 |
| *C. C. Dennis ... ... ... ... | Do. ... ... | 110 | 597 |
| E. A. Smith ... ... ... ... | Do. ... ... | 123 | 594 |
| Miss M. Hinze ... ... ... ... | Do. ... ... | 88 | 591 |
| Mrs. J. Carruthers ... ... ... | Do. ... ... | 107 | 588 |
| *Dr. E. C. Jennings ... ... ... | Do. ... ... | 135 | 545 |
| **HEAVY BREEDS.** | | | |
| *R. Burns ... ... ... ... ... | Black Orpingtons ... | 140 | 884 |
| W. Smith ... ... ... ... ... | Do. ... ... | 130 | 826 |
| *Mars Poultry Farm ... ... ... | Do. ... ... | 145 | 816 |
| A. E. Walters ... ... ... ... | Do. ... ... | 117 | 814 |
| W. S. Hanson, N.S.W. ... ... ... | Do. ... ... | 122 | 755 |
| *E. F. Dennis ... ... ... ... | Do. ... ... | 141 | 751 |

## EGG-LAYING COMPETITION—*continued.*

| Competitors. | Breed. | October. | Total. |
|---|---|---|---|
| **HEAVY BREEDS—*continued.*** | | | |
| F. A. Claussen ... ... ... ... | Rhode Island Reds ... | 106 | 736 |
| Cowan Bros., N.S.W. ... ... ... | Black Orpingtons ... | 105 | 684 |
| Mrs. J. H. Jobling, N.S.W. ... ... | Do. ... ... | 138 | 682 |
| P. C. McDonnell, N.S.W. ... ... | Do. ... ... | 110 | 671 |
| D. Kenway, N.S.W. ... ... ... | Do. ... ... | 111 | 668 |
| H. Jobling, N.S.W. ... ... ... | Do. ... ... | 116 | 654 |
| *E. A. Smith ... ... ... ... | Do. ... ... | 131 | 646 |
| *Oakland Poultry Farm ... ... | Do. ... ... | 117 | 621 |
| King and Watson, N.S.W. ... ... | Do. ... .. | 115 | 620 |
| C. B. Bertelsmeier, S.A. ... ... .. | Do. ... ... | 101 | 600 |
| *Miss M. Hinze ... ... ... ... | Do. ... ... | 125 | 587 |
| E. Morris ... ... ... ... ... | Do. ... ... | 113 | 587 |
| R. Burns ... ... ... ... ... | S. L. Wyandottes ... | 99 | 577 |
| J. M. Manson ... ... ... .. | Black Orpingtons ... | 113 | 565 |
| *Kelvin Poultry Farm ... ... ... | Plymouth Rocks ... | 94 | 557 |
| C. C. Dennis ... ... ... ... | White Wyandottes ... | 94 | 543 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 76 | 518 |
| *F. W. Leney ... ... ... ... | Do. ... ... | 81 | 484 |
| Totals ... ... ... ... | ... | 9,122 | 50,227 |

* Indicates that the pen is engaged in the single hen test.

## DETAILS OF SINGLE HEN TESTS.

| Competitors. | A. | B. | C. | D. | E. | F. | Total. |
|---|---|---|---|---|---|---|---|
| **LIGHT BREEDS.** | | | | | | | |
| G. H. Turner ... ... ... | 121 | 132 | 155 | 149 | 128 | 153 | 838 |
| J. M. Manson ... ... ... | 143 | 134 | 117 | 128 | 130 | 151 | 803 |
| J. Zahl ... ... ... ... | 146 | 103 | 151 | 81 | 153 | 124 | 758 |
| J. R. Wilson ... ... ... | 143 | 124 | 119 | 133 | 105 | 120 | 744 |
| A. T. Coomber ... ... ... | 132 | 69 | 145 | 133 | 125 | 135 | 739 |
| Mrs. Munro ... ... ... | 158 | 107 | 111 | 109 | 89 | 142 | 716 |
| Dixie Egg Plant ... ... ... | 117 | 135 | 134 | 137 | 131 | 34 | 688 |
| A. W. Bailey ... ... ... | 36 | 114 | 135 | 136 | 132 | 133 | 686 |
| T. Fanning ... ... ... | 85 | 118 | 126 | 116 | 106 | 128 | 679 |
| A. E. Walters ... ... ... | 82 | 88 | 99 | 121 | 117 | 109 | 616 |
| C. C. Dennis ... ... ... | 115 | 89 | 48 | 111 | 115 | 119 | 597 |
| Dr. E. C. Jennings ... ... | 55 | 67 | 102 | 109 | 130 | 82 | 845 |
| **HEAVY BREEDS.** | | | | | | | |
| R. Burns ... ... ... ... | 123 | 106 | 158 | 125 | 171 | 201 | 884 |
| Mars Poultry Farm ... ... | 124 | 155 | 124 | 141 | 136 | 136 | 816 |
| E. F. Dennis ... ... ... | 139 | 128 | 141 | 153 | 154 | 36 | 751 |
| E. A. Smith ... ... ... | 111 | 104 | 66 | 143 | 118 | 104 | 646 |
| Oaklands Poultry Farm... ... | 145 | 87 | 89 | 80 | 141 | 79 | 621 |
| Miss M. Hinze ... ... ... | 108 | 90 | 87 | 99 | 112 | 91 | 587 |
| Kelvin Poultry Farm ... ... | 85 | 86 | 89 | 140 | 62 | 95 | 557 |
| F. W. Leney ... ... ... | 84 | 84 | 55 | 76 | 109 | 76 | 484 |

# Botany.

## AN INTERESTING LYCOPOD (CLUB MOSS) FROM NORTHERN QUEENSLAND.

By C. T. WHITE, Government Botanist.

### Order LYCOPODIACEÆ.

LYCOPODIUM HIPPURIS, *Desv.* Spring Monogr. I. 44. Plate ???.

*Description.*—Shoots pendulous or erect with nutant branches, simple or repeatedly forked 1-2½ ft. long. Leaves spreading, of rather thin texture, the lower often deflexed, the higher gradually ascending, subulate-lanceolate, straight or subfalcate, 5-9 lines long and about 1 line broad, acute, entire, the base decurrent, the decurrent portion flat or longitudinally wrinkled. Sporophylla similar in shape to the barren leaves and nearly as long but the upper ones gradually becoming smaller.

*Habitat:* Saltwater Creek, Mossman River. *F. W. Barnard.*

*Distribution.*—Java and Philippines to Samoa. *V. A. V. Rosenburgh.*) A couple of years ago Mr. Barnard presented plants of this fine Lycopod to the Brisbane Botanic Gardens; the specimens are now in fine growth, and, when well grown, the species is undoubtedly one of the handsomest of our native Lycopodiaceæ. It is new to Queensland, and the above description and accompanying plate are presented, as the find is an interesting one both to botanists and horticulturists.

*Lycopodium hippuris* is given by Baker in the "Handbook of the Fern Allies" as a synonym along with *L. ulicifolium,* Vent. of *L. squarrosum,* Forst. The difference between these closely allied species is clearly set forth by Captain C. R. W. K. van Alderwerelt van Rosenburgh in his valuable work, "Malayan Fern Allies."

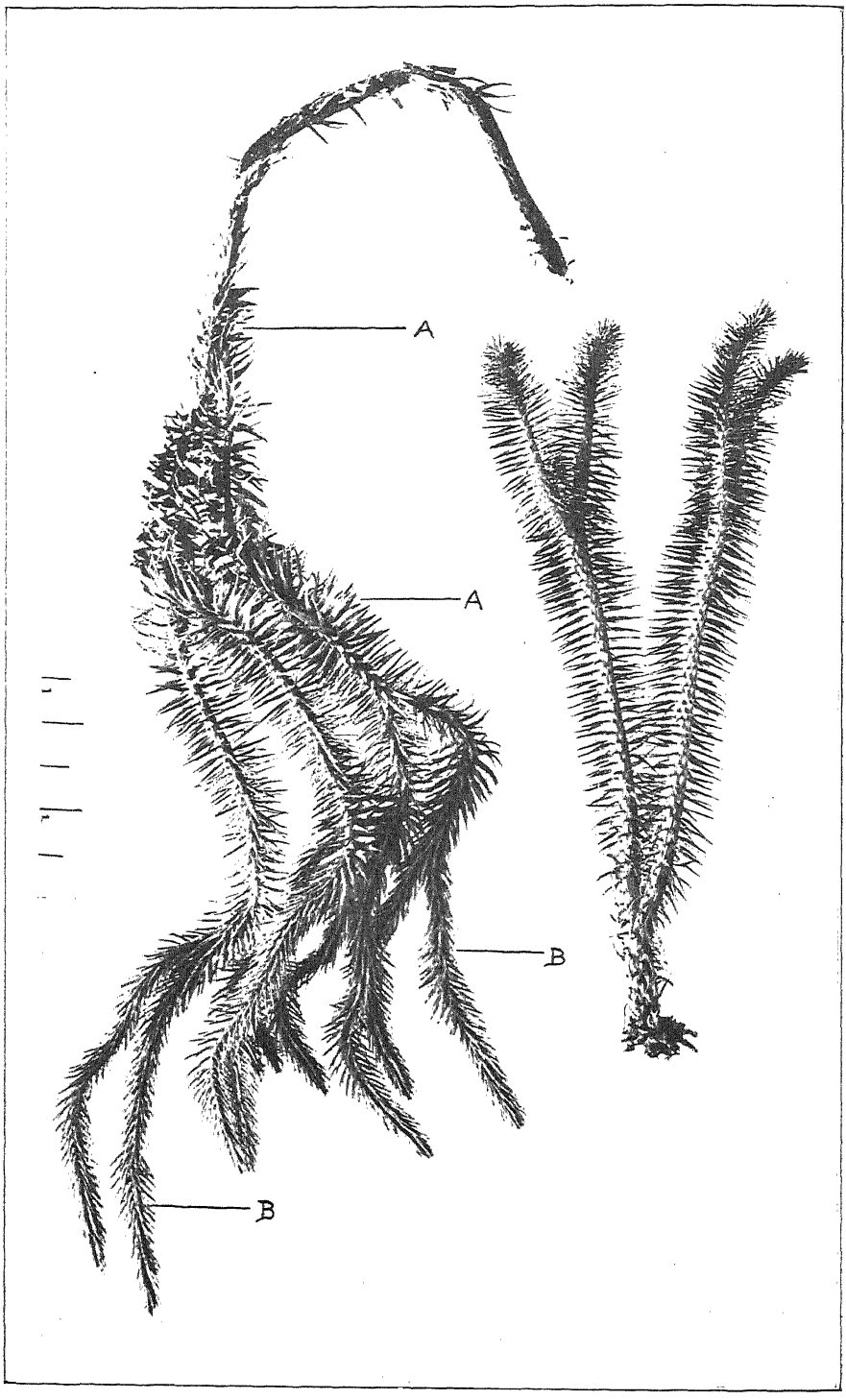



PLATE 43.—LYCOPODIUM HIPPURIS.

Left—An old pendulous shoot. Right—A young erect-growing shoot slightly nutant at the top

A. Lower sterile portion. B. Upper fertile or spore bearing portion.

# General Notes.

## BREEDERS OF PURE-BRED STOCK.

In the November issue of the Journal, Mr. R. S. Alexander's stock was given as 1 male, Holstein F.H.B. of Queensland, and 2 males, Holstein F.H.B. of Australia. This should have been—

1 male; 2 females; H.F.H.B. of Australia.

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## SOCIETIES, SHOW DATES, ETC.

Landsborough.—Bald Knob Branch of the Queensland Farmers' Union. F. D. Young, secretary.

Proston.—Proston Progress and Farmers' Association. T. M. Stephenson, secretary.

Summit, Southern Railway Line.—The Summit Fruitgrowers' and Progress Association. B. Teale, secretary.

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## DRYING RHUBARB.

Experiments on an extensive scale are being carried on along all lines of drying at Iowa State College (U.S.A.). Many products are being experimented with, and as soon as results are obtained will be given to the public. So far, it has been shown that rhubarb, for instance, can be dried at home without injury to colour, flavour, or character, if the following plan is used:—

Select stalks as for immediate use; clean, peel, and cut into small pieces. Place on cheesecloth on a tray in the sun to dry. Do not let the rhubarb touch the metal. With a hot sun and little breeze, the rhubarb should dry thoroughly in about two days. If the weather turns rainy, and the atmosphere becomes saturated, apply artificial heat. This can be done in a cook stove drier if it is available. Place the trays in the drier and hold at a temperature of not over 100 degrees. Allow plenty of circulation of air. Do not dry until it becomes brittle. If no drier is at hand, hang the tray over the stove, high enough so that the temperature will not go above 110 degrees. Do not place in the oven. Circulation of air is needed to get the best results. An electric fan may be used to circulate the air. After it is thoroughly dry, put the dried product in clean sacks or other containers, and store in a clean, dry place.

When wanted for use, soak for sixteen to twenty-four hours, sweeten, and cook the same as fresh rhubarb. One ounce of the dried product makes a pint when cooked. Twenty pounds of fresh rhubarb makes 1 lb. when dried.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR NOVEMBER, 1917.

| Article. | | NOVEMBER. Prices. |
|---|---|---|
| Bacon | lb. | 9½d. to 10d. |
| Barley | bush. | 2s. 6d. to 3s. 3d. |
| Bran | ton | £6 |
| Broom Millet | ,, | £22 to £25 |
| Butter | cwt. | 149s. 4d. |
| Chaff, Mixed | ton | £4 to £4 10s. |
| Chaff, Oaten | ,, | £6 to £7 6s. |
| Chaff, Lucerne | ,, | £4 to £5 10s. |
| Chaff, Wheaten | ,, | £4 10s. |
| Cheese | lb. | 9½d. to 10d. |
| Flour | ton | £12 |
| Hams | lb. | 1s. 3d. to 1s. 4d. |
| Hay, Oaten | ton | £7 10s. |
| Hay, Lucerne | ,, | £2 10s. to £3 5s. |
| Honey | lb. | 2½d. to 3d. |
| Maize | bush. | 4s. 2½d. |
| Oats | ,, | 1s. 6d. to 2s. 6d. |
| Onions | ton | £25 to £27 |
| Peanuts | lb. | 2d. to 5d. |
| Pollard | ton | £6 12s. 6d. |
| Potatoes | ,, | £15 5s. to £19 10s. |
| Potatoes (Sweet) | cwt. | 4s. 10d. |
| Pumpkins (Cattle) | ton | £3 to £5 10s. |
| Eggs | doz. | 5½d. to 8d. |
| Fowls | per pair | 3s. 6d. to 7s. |
| Ducks, English | ,, | 3s. 6d. to 4s. 9d. |
| Ducks, Muscovy | ,, | 4s. 7d. to 6s. 6d. |
| Geese | ,, | 8s. to 8s. 6d. |
| Turkeys (Hens) | ,, | 12s. 6d. to 14s. |
| Turkeys (Gobblers) | ,, | 20s. to 25s. |
| Wheat | bush. | 4s. 9½d. |

(no supplies)

## VEGETABLES—TURBOT STREET MARKETS.

| | |
|---|---|
| Asparagus, per dozen bundles | 5s. to 7s. 6d. |
| Cabbages, per dozen | 1s. to 5s. 6d. |
| Cauliflowers, per dozen | 1s. to 4s. 6d. |
| Beans, per sugar bag | 1s. 6d. to 2s. |
| Peas, per sugar bag | 4s. to 6s. |
| Carrots, per dozen bunches | 1s. 5d. to 1s. 6d. |
| Beetroot, per dozen bunches | 9d. to 1s. |
| Lettuce, per dozen | 1s. to 1s. 6d. |
| Parsnips, per bundle | 7d. to 10d. |
| Sweet Potatoes, per sugar bag. | 2s. 6d. to 2s. 8d. |
| Table Pumpkins, per dozen | 6s. to 7s. 6d. |
| Marrows, per dozen | 1s. to 1s. 6d. |
| Tomatoes, per case | 1s. 6d. to 7s. 3d. |
| Cucumbers, per case | 6d. to 1s. 9d. |

## SOUTHERN FRUIT MARKETS.

| Article. | NOVEMBER. Prices. |
|---|---|
| Bananas (Queensland), per crate | 7s. to 9s. |
| Bananas (Tweed River), per crate | 14s. to 18s. |
| Bananas (Fiji), per crate | ... |
| Bananas (G.M.), per crate | ... |
| Guavas, per case | ... |
| Lemons, per case | 5s. to 10s. |
| Mandarins, per case | 7s. to 14s. |
| Mangoes, per case | 10s. to 12s. |
| Oranges (Navel), per case | 11s. to 16s. |
| Oranges (Seville), per bushel case | 7s. |
| Oranges (other), per case | 8s. to 12s. |
| Papaw Apples, per half-bushel case | 8s. to 12s. |
| Passion Fruit, per half-bushel case | 10s. |
| Pineapples (Queens), per double case | 8s. to 11s. |
| Pineapples (Ripleys), per double case | 7s. to 9s. |
| Pineapples (Common), per double case | 7s. to 9s. |
| Tomatoes (Queensland), per half-bushel case | 6s. to 8s. |
| Cucumbers, per bushel | 10s. to 15s. |
| Strawberries, per tray | 1s. to 2s. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | NOVEMBER. Prices. |
|---|---|
| Apples, Eating, per bushel case | 20s. to 30s. |
| Apples, Cooking, per bushel case | 10s. to 20s. |
| Bananas (Cavendish), per dozen | 1d. to 5d. |
| Bananas (Sugar), per dozen | 2d. to 5d. |
| Cape Gooseberries, per quarter-case | 8s. to 10s. |
| Citrons, per hundredweight | 11s. |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per quarter-case | 4s. to 5s. |
| Grapes, per lb. | 2d. to 7d. |
| Lemons (Lisbon), per case | 5s. to 12s. |
| Mandarins, per case | 5s. to 12s. |
| Mangoes, per case | 2s. to 7s. 6d. |
| Oranges (Navel), per case | 12s. 6d. to 14s. 6d. |
| Oranges (Seville), per hundredweight | 3s. 6d. to 7s. |
| Oranges (other), per case | 5s. to 10s. |
| Papaw Apples, per quarter-case | 2s. to 3s. |
| Passion Fruit, per half-bushel case | 12s. to 14s. |
| Peaches, per half-bushel case | 3s. 6d to 5s. |
| Pears, per quarter-case | ... |
| Peanuts, per lb. | 2d. to 5d. |
| Pineapples (Ripleys), per dozen | 1s. to 4s. 6d. |
| Pineapples (Rough), per dozen | 6d. to 4s. 6d. |
| Pineapples (Smooth), per dozen | 1s. to 3s. 6d. |
| Strawberries, per tray | 1s. to 2s. 6d. |
| Tomatoes, per case | 2s. 6d to 7s. |
| Watermelons, per dozen | 7s. to 15s. |

## TOP PRICES, ENOGGERA YARDS, OCTOBER, 1917.

| Animal. | OCTOBER. Prices. |
|---|---|
| Bullocks | £25 7s. 6d. to £30 15s. |
| Bullocks (Single) | £40 |
| Cows | £14 to £20 |
| Cows (Single) | £22 10s. |
| Merino Wethers | 58s. |
| Crossbred Wethers | 55s. |
| Merino Ewes | 42s. 6d. |
| Crossbred Ewes | 40s. 3d. |
| Lambs | 39s. 3d. |
| Pigs (Bacon) | 61s. |
| Pigs (Porkers) | 46s. |
| Pigs (Suckers) | 12s. |

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF OCTOBER 1917, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING OCTOBER, 1917 AND 1916, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. Oct. | Average Rainfall. No. of Years' Records. | Total Rainfall. Oct., 1917. | Total Rainfall. Oct., 1916. |
|---|---|---|---|---|
| *North Coast.* | In. | | In. | In. |
| Atherton | 0·76 | 15 | 4·10 | 0·47 |
| Cairns | 1·78 | 34 | 7·21 | 7·13 |
| Cardwell | 1·87 | 44 | 8·00 | 2·18 |
| Cooktown | 1·13 | 40 | 1·28 | 2·94 |
| Herberton | 0·94 | 29 | 1·19 | 0·85 |
| Ingham | 1·56 | 24 | 1·95 | 1·15 |
| Innisfail | 2·74 | 35 | 5·04 | 14·14 |
| Mossman | 5·04 | 5 | 4·99 | 10·29 |
| Townsville | 1·23 | 45 | 0·37 | 2·57 |
| *Central Coast.* | | | | |
| Ayr | 0·94 | 29 | 0·32 | 1·16 |
| Bowen | 1·09 | 45 | 0·54 | 1·21 |
| Charters Towers | 0·70 | 34 | 0·70 | 0·42 |
| Mackay | 1·99 | 45 | 0·82 | 4·04 |
| Proserpine | 1·65 | 13 | 1·02 | 5·94 |
| St. Lawrence | 1·79 | 45 | 3·13 | 6·15 |
| *South Coast.* | | | | |
| Biggenden | 2·20 | 17 | 1·20 | 6·12 |
| Bundaberg | 2·08 | 33 | 2·39 | 5·81 |
| Brisbane | 2·70 | 66 | 1·58 | 3·30 |
| Childers | 2·08 | 21 | 1·68 | 6·10 |
| Crohamhurst | 3·79 | 25 | 1·67 | 6·04 |
| Esk | 2·42 | 29 | 2·86 | 3·06 |
| Gayndah | 2·38 | 45 | 1·51 | 6·71 |
| Gympie | 2·76 | 46 | 0·56 | 5·59 |
| Glasshouse M'tains | 3·00 | 8 | 1·55 | 5·67 |
| Kilkivan | 2·78 | 37 | 0·56 | 4·23 |
| Maryborough | 2·74 | 45 | 1·79 | 5·70 |
| *South Coast*—continued: | | | | |
| Nambour | 3·11 | 20 | 1·77 | 7·82 |
| Nanango | 2·33 | 34 | 1·97 | 5·87 |
| Rockhampton | 1·80 | 29 | 1·53 | 4·09 |
| Woodford | 2·69 | 29 | 1·09 | 5·34 |
| *Darling Downs.* | | | | |
| Dalby | 2·14 | 46 | 1·22 | 3·57 |
| Emu Vale | 2·45 | 20 | 2·72 | 2·45 |
| Jimbour | 1·89 | 28 | 0·96 | 3·54 |
| Miles | 2·03 | 31 | 2·78 | 2·19 |
| Stanthorpe | 2·66 | 43 | 2·87 | 3·36 |
| Toowoomba | 2·69 | 44 | 2·92 | 4·11 |
| Warwick | 2·35 | 29 | 2·57 | 2·15 |
| *Maranoa.* | | | | |
| Roma | 1·76 | 42 | 1·39 | 2·04 |
| *State Farms, &c.* | | | | |
| Bungeworgorai | 1·42 | 5 | 1·86 | 1·90 |
| Gatton College | 2·46 | 17 | 1·21 | 2·93 |
| Gindie | 1·36 | 17 | 0·05 | 2·39 |
| Hermitage | 2·06 | 10 | 2·39 | 1·92 |
| Kairi | 1·22 | 5 | 3·35 | 1·32 |
| Kamerunga | 1·56 | 26 | 3·30 | 4·99 |
| Sugar Experiment Station, Mackay | 1·69 | 19 | ... | 6·08 |
| Warren | 2·34 | 5 | 1·19 | 4·59 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for October this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

# ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

## TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON.

| 1917. | SEPTEMBER. | | OCTOBER. | | NOVEMBER. | | DECEMBER. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·2 | 5·34 | 5·29 | 5·47 | 4·59 | 6·5 | 4·46 | 6·28 |
| 2 | 6·1 | 5·34 | 5·28 | 5·48 | 4·58 | 6·6 | 4·46 | 6·28 |
| 3 | 6·0 | 5·35 | 5·27 | 5·48 | 4·58 | 6·7 | 4·46 | 6·29 |
| 4 | 5·59 | 5·35 | 5·26 | 5·49 | 4·57 | 6·7 | 4·46 | 6·30 |
| 5 | 5·58 | 5·36 | 5·25 | 5·49 | 4·57 | 6·8 | 4·46 | 6·31 |
| 6 | 5·57 | 5·36 | 5·24 | 5·50 | 4·56 | 6·9 | 4·46 | 6·32 |
| 7 | 5·55 | 5·36 | 5·23 | 5·50 | 4·55 | 6·9 | 4·46 | 6·32 |
| 8 | 5·54 | 5·37 | 5·22 | 5·51 | 4·54 | 6·10 | 4·46 | 6·33 |
| 9 | 5·53 | 5·37 | 5·20 | 5·51 | 4·54 | 6·11 | 4·47 | 6·33 |
| 10 | 5·52 | 5·38 | 5·19 | 5·52 | 4·53 | 6·11 | 4·47 | 6·34 |
| 11 | 5·51 | 5·38 | 5·18 | 5·52 | 4·52 | 6·12 | 4·47 | 6·34 |
| 12 | 5·50 | 5·39 | 5·17 | 5·53 | 4·52 | 6·13 | 4·47 | 6·35 |
| 13 | 5·49 | 5·39 | 5·16 | 5·53 | 4·51 | 6·14 | 4·47 | 6·35 |
| 14 | 5·48 | 5·40 | 5·15 | 5·54 | 4·51 | 6·15 | 4·48 | 6·36 |
| 15 | 5·47 | 5·40 | 5.14 | 5·54 | 4·50 | 6·16 | 4·48 | 6·36 |
| 16 | 5·45 | 5·41 | 5·13 | 5·55 | 4·50 | 6·17 | 4·48 | 6·37 |
| 17 | 5·44 | 5·41 | 5·12 | 5·55 | 4·49 | 6·18 | 4·48 | 6·38 |
| 18 | 5·43 | 5·42 | 5·11 | 5·56 | 4·49 | 6·19 | 4·49 | 6·39 |
| 19 | 5·42 | 5·42 | 5·10 | 5·56 | 4·48 | 6·19 | 4·49 | 6·40 |
| 20 | 5·41 | 5·42 | 5.9 | 5·57 | 4·48 | 6·20 | 4·50 | 6·40 |
| 21 | 5·40 | 5·43 | 5·8 | 5·57 | 4·47 | 6·21 | 4·50 | 6·41 |
| 22 | 5·39 | 5·43 | 5·7 | 5·58 | 4·47 | 6·22 | 4·51 | 6·42 |
| 23 | 5·37 | 5·44 | 5·6 | 5·59 | 4·47 | 6·22 | 4·51 | 6·42 |
| 24 | 5·36 | 5·44 | 5·5 | 5·59 | 4·47 | 6·23 | 4·52 | 6·43 |
| 25 | 5·35 | 5·45 | 5·4 | 6·0 | 4·47 | 6·24 | 4·52 | 6·43 |
| 26 | 5·34 | 5·45 | 5·3 | 6·0 | 4·46 | 6·24 | 4·53 | 6·43 |
| 27 | 5·33 | 5·45 | 5·3 | 6·1 | 4·46 | 6·25 | 4·53 | 6·44 |
| 28 | 5·32 | 5·46 | 5·2 | 6·1 | 4·46 | 6·26 | 4·54 | 6·44 |
| 29 | 5·31 | 5·46 | 5·1 | 6·2 | 4·46 | 6·26 | 4·55 | 6·44 |
| 30 | 5·30 | 5·47 | 5·0 | 6·3 | 4·46 | 6·27 | 4·56 | 6·45 |
| 31 | ... | ... | 5·0 | 6·4 | 4·46 | ... | 4·57 | 6·45 |

The times given are for the whole of Queensland, New South Wales, and Victoria, where the same Standard Time is observed.

| | | | H. | M. |
|---|---|---|---|---|
| 1 Sept. | ○ | Full Moon | 10 | 28 p.m. |
| 8 „ | ☽ | Last Quarter | 5 | 5 „ |
| 16 „ | ● | New Moon | 8 | 28 „ |
| 24 „ | ☾ | First Quarter | 3 | 41 „ |

The Moon will be at its greatest distance from the earth at midnight on the 14th, and at its least distance on the night of the 30th.

| | | | | |
|---|---|---|---|---|
| 1 Oct. | ○ | Full Moon | 6 | 31 a.m. |
| 8 „ | ☽ | Last Quarter | 6 | 14 p.m. |
| 16 „ | ● | New Moon | 12 | 41 „ |
| 24 „ | ☾ | First Quarter | 12 | 38 a.m. |
| 30 „ | ○ | Full Moon | 4 | 19 p.m. |

The moon will be furthest from the earth on the 12th, and nearest to it on the 28th.

| | | | | |
|---|---|---|---|---|
| 7 Nov. | ☽ | Last Quarter | 3 | 4 a.m. |
| 15 „ | ● | New Moon | 4 | 28 „ |
| 22 „ | ☾ | First Quarter | 8 | 29 „ |
| 29 „ | ○ | Full Moon | 4 | 41 „ |

The Moon will be furthest from the earth on the 9th, and nearest to it on the 24th.

| | | | | |
|---|---|---|---|---|
| 7 Dec. | ☽ | Last Quarter | 12 | 14 a.m. |
| 14 „ | ● | New Moon | 7 | 17 p.m. |
| 21 „ | ☾ | First Quarter | 4 | 7 „ |
| 28 „ | ○ | Full Moon | 7 | 52 „ |

The Moon will cause an *Annular Eclipse* of the *Sun* on December 14th, but it will not be visible in Queensland. On the 28th there will be a *Total Eclipse* of the *Moon* between 7.38 and 7.55 p.m. It will be partly eclipsed for an hour and a-half before and after totality.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during September, October, and November, may be roughly arrived at by adding 16 minutes to those given above for Brisbane.

The moon light nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

# Farm and Garden Notes for January.

FIELD.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish Blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye, and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole. Early-sown cotton will be in bloom.

KITCHEN GARDEN.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw, grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflower, mustard, cabbage, celery, radish, for autumn and winter use. Sow celery in shallow, well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower-beds gay and attractive during the autumn and winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotten leaves. Fill the boxes with the compost: then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle lift them gently one by one with a knife or a zinc label—*never pull them up by hand*, as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Then prick them out into beds or boxes of very light soil containing plenty of leaf mould. Then keep a sharp lookout for slugs and caterpillars. Keep a supply of tobacco dust on hand, and scatter this in the path of the slug, and he will cease from troubling you.

All kinds of shrubby plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to over-water at this season. Propagate verbenas, not forgetting to include the large scarlet Fox-hunter. Verbenas require rich soil. Palms may be planted out this month. If the weather prove dry, shade all trees planted out. With seed-boxes, mulch, shade, water, and kerosene spray, all of which imply a certain amount of morning and evening work, the flower garden in autumn and winter will present a charming sight, and will afford light and profitable work for girls with spare time on their hands.

An exhaustive booklet on "Flower Gardening for Amateurs" has been issued by the Department of Agriculture and Stock, and may be obtained from the Office. Price, 2s.

# Orchard Notes for January.

## THE SOUTHERN COAST DISTRICTS.

The fruit of the month in this part of the State is the grape, and its gathering and marketing will occupy the attention of growers. Care should be taken to cut the fruit when cool and dry, and if it has to be sent any distance the stems of the bunches should be allowed to wilt before the fruit is packed, as the berries will then hang on to the bunch better, and the bunch carry in better order. Select the fruit carefully, grade it, and pack firmly so that it will not bruise in transit. If to be sent long distances, pack in crates holding from four to six 6-lb. baskets. Pines will be ripening in quantity towards the end of the month. Gather before fully coloured, and, whether for Southern or local markets, pack and handle carefully to prevent bruising. Do not ship the fruit too green for the Southern markets, as doing so is apt to spoil the trade. Send good fruit to the canneries. Small pines and crippled fruit are no good to canners, and the sooner our growers realise that it only pays to grow good fruit the better for them and for the canners, as if the latter cannot get good fruit it is impossible for them to put a line of goods that will not only be a credit to the State, but for which a world-wide market can be obtained.

Passion fruit should not be allowed to lie about for days on the ground before gathering, as if so they are apt to become fly-infested.

Watermelons and rock melons are still in season.

Watch any late peaches, Japanese plums, or other fruits liable to be infested with fruit-fly, and gather and destroy all infested fruit, or, better still, grub the trees out and burn them, as they only breed flies to destroy more valuable fruit. Mangoes will be ripening during the month. See that all fly-infested fruits are destroyed, as they will only breed up further crops to destroy later ripening fruits.

Citrus orchards can be cyanided during the month for scale insects, and spraying for Maori with the sulphide of soda wash should be continued where necessary.

Mangoes can be budded during the month, as well as citrus and deciduous trees. Tropical fruit trees can be transplanted, taking care to choose dull weather and to cover same from the direct rays of the sun till they have become firmly established. Pines and bananas can still be planted.

## THE TROPICAL COAST DISTRICTS.

See that all bananas are covered with netting, as the fly is usually at its worst at this time of year.

Mangoes will be going off. See that they are not allowed to remain about on the ground to breed flies for the autumn crop of oranges. Longan, litchi, and other fruit are in season. As the month is often a very wet one, little cultivation can be done in the orchards. Strong undergrowth should, however, be kept down with a hoe or scythe. Tropical fruits of all sorts can be planted. Look out for Maori on citrus fruits, and spray when necessary.

## THE SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Stanthorpe district, apples, pears, plums, peaches, and nectarines being in season. Do not gather the fruit too immature; at the same time, don't allow it to be over-ripe. Gather dry, handle carefully, grade and pack in attractive cases. Keep the fruit as cool as possible, and ship in well-ventilated cars. Keep a sharp lookout for fruit-fly, and take every possible means to prevent its spreading, even going as far as to gather and destroy the whole of the fruit on any infected trees, as if kept in check during the month the bulk of the fruit ripening during February will be free.

Keep a sharp lookout also for codling moth; examine the bandages on the trees at least every ten days, and destroy all larvæ found therein; also gather and destroy all moth-infected fruit.

Gather Bartlett pears as soon as they are large enough, and store away in a cool shed to ripen; when they show signs of ripening, market, not before. If sent down green they will sell for cooking, and only fetch a small price. The right stage at which to gather is when the fruit is fully developed, and the flesh has lost its woody flavour, but is still quite hard. This is usually before the fly has stung it, and if gathered at this stage the fruit will ripen up properly without shrivelling, and develop its full flavour.

These remarks apply also to the Downs country, which is somewhat earlier than Stanthorpe.

The crop of the month in the Western tablelands is the grape; and the remarks I have made respecting this fruit when grown in the Southern Coast districts apply equally here. The fruit should be gathered dry, and wilted before it is packed. Too large cases are often used; cases holding from 20 to 30 lb., or crates holding six 6-lb. baskets, are preferable, the latter being the best package for shipping the fruit long distances. Keep the orchards well cultivated, and, where water for irrigation is available, give citrus trees a watering during the month, unless there has been a sufficient rainfall. When the orchard is irrigated, see that thorough cultivation follows the irrigation, so as to conserve the moisture in the soil.

Red Scale, which is prevalent on citrus trees in the dry Western country, should be treated during the month. Cyaniding is the best remedy.

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# QUEENSLAND AGRICULTURAL JOURNAL

VOL. XXI. JANUARY, 1924. PART 1.

## Event and Comment.

### The Current Issue.

A survey of the agricultural position in Queensland and a review of matters affecting our rapidly increasing dairying industry are among the more important features of this issue. Systems of irrigation are discussed in a further instalment of Mr. Eklund's notes. The Tamworth breed of Pigs is Mr. Shelton's subject this month. Growing interest in forestry problems has suggested a very interesting summary of "Eucalyptian Facts," which will be appreciated by all who are impressed with the value of our first and one of our greatest crops—our native forests. A valuable paper on insects affecting sugar-cane will be read with interest by all concerned in applied entomology. Another useful January feature covers notes on insects injurious to cotton. The regular features of the Journal extend over a wide field and as usual good illustrations add value to the contents.

### The Sugar Industry—Research Scholarships.

The Acting Premier and Minister for Agriculture and Stock (Hon. W. N. Gillies) has announced that Executive approval has been given to a scheme which designated as the first practical step towards the conjunction of the scientific of the University with the agricultural industry. The proposal was first His Honour Chief Justice McCawley, who is also a member of the Sena University, and covers briefly the institution of three travelling schola scientific research work for the benefit of our great sugar industry. The was accepted by the Government and to it has been added advice from the Uni the Public Service Commissioner, the Central Sugar Cane Prices Board, the of Agriculture, the Australian Sugar Producers' Association, the United Cane Association, the Director of Sugar Experiment Stations, and the General Ma the Sugar Bureau. The Government has decided to provide three t scholarships each of the value of £300 a year and tenable for four years, general competition, but preference may be given to students of the Qu University who possess a science degree. One scholarship will be for Sugar I ing and Chemistry, one for Plant Pathology, and one for research in Soil F The holders of the scholarships will have to devote themselves for the first studying the sugar industry in Queensland, and thereafter undergo training

places and institutions abroad as the Minister for Agriculture may decide. The cost of the passage to and from the place chosen abroad will be paid to the holder of the scholarship, and, of course, there will be the value of the scholarship—£300 a year. Each scholarship holder will also be required to sign an undertaking to enter, at the expiration of the term, the employment of the Department of Agriculture on work pertaining to the sugar industry, for at least four years, in any part of the State, with remuneration at a rate of not less than £300 a year.

## Co-operative Marketing Associations Act.

The Primary Producers' Co-operative Associations Act provides for the formation, registration, and management of primary producers' co-operative associations. Its provisions are now in operation. This is a measure of much importance to the farmers of Queensland, and the Acting Premier and Minister for Agriculture (Hon. W. N. Gillies), who is charged with the administration of the Act, in the course of a recent Press interview, said that farmers justly complain that in seasons when production is heaviest, prices are lowest, and *vice versâ*. If prices are to be stabilised distribution must be organised. The outcome of all experience in handling farm produce is that this can be best achieved through co-operative marketing which really means the co-ordination of growers' interests in very widely separated localities, and the creation of a central selling body. The most common form of co-operative marketing practised in most countries to-day is co-operative pooling, or organisation on a commodity basis. Such bodies acquire a legal personality under the provisions of the Queensland Act, and must conform to the rules of management prescribed by it. Under our Companies Act there is no basis of control other than the amount of capital subscribed. It contemplates no other means of control. Under it the rights and obligations of producers' co-operative societies are not clearly defined. The purpose of the new legislation is to remedy these deficiencies. For example, such associations must have the right to make the voting power of its members equal, or in ratio to the amount of produce purchased or contributed. The Act gives this power. Again, associations must be able to control the transfer of shares in order to ensure that every member shall be a producer or purchaser directly interested in the services which the association performs. The Act provides a means by which a member may disconnect from an association when he ceases to be a contributing producer, a provision rendered necessary in order to prevent control passing out of the hands of producers. One of the outstanding features of the measure is that it provides that the agency itself conducting the business must be composed of and managed by the active producers of the commodity handled, and its benefits returned to them in proportion to the use or patronage of each.

Activities are restricted to the primary purposes of the organisation, with each association having a marketing problem common to all its members. The bond of association is a contract voluntarily entered into by each member, thus assuring a definite volume of business, and careful grading is a corollary permitting of the payment of accurate and average prices.

These associations will render service at cost, and, generally speaking, they will make no profit, pay no dividends, and accumulate no surplus. As they will handle mainly perishable products price-fixing will not be practicable. There is no element of compulsion in this measure. Its provisions contemplate voluntary associations brought into being to give effect to principles of self-help and mutual service. It is designed to facilitate collective effort for a purpose, having many conspicuous advantages over unaided individual effort.

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places and institutions abroad as the Minister for Agriculture may decide. The cost of the passage to and from the place chosen abroad will be paid to the holder of the scholarship, and, of course, there will be the value of the scholarship—£300 a year. Each scholarship holder will also be required to sign an undertaking to enter, at the expiration of the term, the employment of the Department of Agriculture on work pertaining to the sugar industry, for at least four years, in any part of the State, with remuneration at a rate of not less than £300 a year.

## Co-operative Marketing Associations Act.

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